



Centre for Global  
Economic History

RECONSTRUCTING THE HISTORY  
OF GLOBAL INEQUALITY



Universiteit Utrecht

## CGEH Working Paper Series

# **Reply to Tracy Dennison and Sheilagh Ogilvie: The European Marriage pattern and the Little Divergence**

Sarah G. Carmichael, Utrecht University

Alexandra de Pleijt, Utrecht University

Jan Luiten van Zanden, Utrecht University

Tine de Moor, Utrecht University

July 2015

Working paper no. 70

[www.cgeh.nl/working-paper-series/](http://www.cgeh.nl/working-paper-series/)

# Reply to Tracy Dennison and Sheilagh Ogilvie: The European Marriage pattern and the Little Divergence

Sarah G. Carmichael, Utrecht University

Alexandra de Pleijt, Utrecht University

Jan Luiten van Zanden, Utrecht University

Tine De Moor, Utrecht University

**Abstract:** This reply reviews the evidence presented by Dennison and Ogilvie that the European Marriage Pattern did not contribute to economic growth in Early Modern Europe (EMP). First, we argue that the link between the EMP and economic growth is not conceptualized correctly. Age of marriage is not a correct index of the degree to which countries were characterized by EMP. Secondly, we show that our alternative interpretation of the EMP, focusing on the underlying institutions and the related balance of power between men and women, solves this problem. We find a strong correlation between economic growth and female agency.

**Keywords:** Marriage patterns, Economic growth, Institutions.

**JEL Codes:** N34, O43, J11, J12.

**Corresponding author:** Jan Luiten van Zanden, [j.l.vanzanden@uu.nl](mailto:j.l.vanzanden@uu.nl).

## 1. Introduction

Do institutions matter for economic growth? And which institutions enhance economic development, and which impede it? This is, in a nutshell, arguably the most fascinating debate in economics, in which economic historians participate on a large scale. The debate is dominated by the representatives of New Institutional Economics, such as Douglass North (1981), Avner Greif (2006), and Daron Acemoglu and James Robinson (2012), who have argued that institutions are the main drivers of economic change, and more specifically, that certain Western European institutions help to explain the ‘Rise of the West’ in the centuries between 1000 and 1800. But this assessment has not gone unchallenged, and in particular Sheilagh Ogilvie has criticized the ‘new orthodoxy’ in a number of important papers and books (Ogilvie 2007; 2011; 2012; Edwards and Ogilvie 2012). Her main point is that we should not assume that ‘whatever is, is right’, that, more specifically, institutions that exist in dynamic economies necessarily contribute to development (Ogilvie 2007). She has particularly concentrated on the (dis)advantages of guilds (and other trade related institutions) to make this point (Ogilvie 2008), but recently – in the paper co-authored with Tracy Dennison under review here – has focused on the European Marriage Pattern, in a similar critique.

Dennison and Ogilvie (2014) (D&O) essentially follow the classic papers by John Hajnal who argued that the European Marriage Pattern can be identified on the basis of a number of distinctive features: high age of marriage for women, a high percentage of singles, and a low percentage complex households (as most households are nuclear) (Hajnal 1965).<sup>1</sup> Hajnal found these features in Europe west of the famous Hajnal line, running from Trieste to St. Petersburg. The EMP has resurfaced in the recent discussions of the institutional determinants of the Great Divergence as one of the factors contributing to the long-term economic performance of the region. In various ways, it was argued in the ‘Girlpower’ paper (De Moor and Van Zanden 2010), this institution (or interrelated set of institutions) enhanced economic growth: by restraining population growth (the classical argument found in Hajnal’s original contribution), by strengthening the position of women, by enhancing human capital formation (of women and their offspring) and by encouraging their access to labour and capital markets. We return to the details below, but the point here is that D & O test these ideas by looking at the correlation between the mentioned features of the EMP and the pattern of economic growth in early modern Europe. When looking for this correlation they subdivide countries into three categories: pure, moderate and extreme forms of the EMP. They have put together a large dataset on some of the features of the marriage pattern as discussed by Hajnal, but on that basis arrive at the conclusion that the presence of the European marriage pattern has no explanatory power when it comes to economic growth. The institution as such does not seem to matter.

---

<sup>1</sup> Hajnal also mentioned a large share of the population working as life-cycle servants and a low age gap between marriage partners.

Their paper can be read as an attempt to test Hajnal's original hypothesis (although there are many problems with such a reading of the paper), but they have not taken seriously the new interpretation of this hypothesis that has been presented in various paper(s) (De Moor and Van Zanden 2010; Carmichael et al. 2011; Carmichael and Van Zanden 2015). We firstly argue that the Hajnal version of the EMP hypothesis cannot be tested in the way they suggest, as the age of marriage is not only determined by the presence or not of the EMP but also related to the degree of economic stress (due to low living standards) that marriage partners face. Moreover, they do not test the new interpretation of the EMP that has been proposed in the Girlpower paper, which focuses on the underlying institutions instead of the features of the EMP. We suggest a way to test the latter hypothesis directly, and present evidence that the EMP enhanced the economic performance of Western European countries between 1300 and 1800. Below we will start our response with discussing the underlying theory -or rather theories- and then move on to present some further empirical material to support our own arguments. But before doing so we want to stress the importance of the contribution made by Dennison and Ogilvie. It allows us, and no doubt other frequently mentioned authors, to develop our ideas more clearly. Thanks to the additional research done since the publication of the Girlpower paper in 2010, we are now able to link the EMP with broader debates among development economists.

## **2. Conceptual Issues: what is the EMP and how to measure it?**

Hajnal's hypothesis of the EMP can be seen as a special case of the more encompassing theory of the family system. This broader theory – mainly developed by ethnographers, sociologists (such as Todd 1985; 1987) and demographers – maintains that there are important international (and regional) differences in the norms and values that determine behavior at the micro level concerning marriage, family, reproduction, and upbringing, which tend to persist over time and change only slowly and in a highly path dependent way. Family life in central Africa is differently organized than in China or Western Europe, and the various institutions (as 'rules of the game') determining behaviour at the micro level are to some extent interdependent and form a coherent whole. In patriarchal societies women usually also do not inherit (or even own) property, for example (except for their dowry). This clustering of institutions makes it possible to use the concept of a family system to describe such sets of more or less coherent institutions (about which more below). The literature on the EMP has given rise to a large debate about the classification and regional variation of such family/marriage systems in Europe, focusing on the nuclear family, the stem family and the extended family as the main systems to be distinguished (Laslett and Wall 1972; Engelen and Wolf 2005). An extended classification for family systems of the world was developed by Emmanuel Todd (1985; 1987).

These sets of rules have a substantial impact on behaviour at the micro level: it matters if marriage is arranged and girls marry at age 12 or if it is based on consensus and marriage is at age 25. One of the links between the family system and such 'societal outcomes' is the degree of agency (autonomous decision making power) women have in a family system. In the Girlpower paper (De Moor and Van Zanden 2010) it was argued that the EMP, as it was

based on consensus and neo-locality as the two core institutions, resulted in and was a reflection of a relatively high degree of female agency, and that, by contrast, in most pre-modern family systems female autonomy is quite limited. Consensus, introduced by the Catholic Church as a norm, meant that the young woman (and obviously also the young man) had to agree with the choice of a marriage partner, or actually engaged in the search for a partner herself, which strengthened the position of (young) women. Neo-locality meant that partners set up an independent household after marriage, and were not living in with either set of parents; again, this created a lot of opportunities for autonomous decision making by man and wife.

Female agency is, moreover, an important driver of development. Many studies have demonstrated that high female agency tends to result in lower fertility and higher levels of human capital formation, basically because the opportunity costs of childrearing for women differ from those of men, as they are the ones who bear most of the costs of having and rearing children. A central hypothesis in this literature is that there are strong links between the level of female education, women's demographic behaviour (in particular fertility), and the level of investment in the human capital of the next generation. Behind this reasoning is the famous 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 choose to have fewer children, but increase investment in the human capital of those fewer children. This trade-off is driven by the opportunity cost of childrearing for women. Thus, more female agency and greater say of women in decision making at the household level, will further the switch to quality of offspring. Moreover, 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). These arguments have received support from modern demographic research (e.g., Becker et al. 2010; Vogl 2013; Rosenzweig and Wolpin 1980; Rosenzweig and Zhang 2009). It has also been demonstrated that the level of education of children is determined to a significant extent by the human capital of the mother – and less so by that of the father (e.g., Brown 2006). Moreover, the valuation of children, and especially son preference, differs between family systems, which has a direct impact on the quantity-quality trade-off (Mason 2001). There are, therefore, close connections between family systems, gender inequality, fertility and human capital formation at the micro level; or in other words, female agency is an important driving force behind the quantity-quality trade off.

The literature suggests more arguments for the crucial importance of female agency. Amartya Sen conceptualizes development as 'freedom', implying that agency for women in itself is valuable. New Institutional Economics, however, has been less sensitive to gender issues; seminal studies by North (1981), North et al. (2009), and Acemoglu and Robinson (2012) do not mention the gender dimension, and the NEI literature only pays occasional attention to the topic. That is strange, to say the least, as power issues have been a central concern: North focused on how to constrain the executive and as a result safeguard property rights, and Acemoglu and Robinson saw power imbalances resulting in extractive institutions as a key problem in economic development. One can argue that in a similar way power balances

between genders matter; that the property rights of 50% of mankind can only be respected if the power of men is institutionally constrained, making it possible for women to freely participate in market exchanges, invest and innovate (Teignier and Cuberes 2014; Currie and Moretti 2003). This insight has attracted considerable attention recently – the Worldbank for example coined the phrase ‘smart economics’ for it (World Bank 2011).

Against this background the Girlpower paper analyzed the European Marriage Pattern as a family system characterized by consensus and neo-locality as the two key institutions, but related and perhaps almost as important is that women can own property and have a share in inheritance, that marriage is strictly monogamous (even, *de jure*, for the elite), and exogamous (one marries outside the kin-group, leaving more room for choice). All these institutions strengthen the position of women – as we will see below, for a pre-modern family system the EMP is exceptionally ‘girlfriendly’. This analysis differs substantially from Hajnal’s classic interpretation of the EMP. As we saw already, he focused on a number of features that were characteristic of marriage in Western Europe between 1600 and 1900, in particular high ages of marriage for women (over 23 years on average), a high share of single women, and a large group of life-cycle servants. We argue that these ‘superficial’ features result from the underlying institutions, of which consensus is probably the most important; it is these institutions that really make the difference.

There is another strand of literature that analyses the EMP as a ‘homeostatic regime’, which not only limits population growth (via the postponement of marriage by women to age 23-27, and through a large group of single women), but also stresses that age of marriage (and share of singles) responds to economic pressures (Wrigley and Schofield 1981; Clark 2007). Couples have to save for setting up a household after marriage (as neo-locality is the norm); when real wages are high and the demand for labour is booming, age of marriage will be lower than when wage levels are low. In other words, the degree of economic stress faced by men and women active on the labour market, will affect the outcomes of the ‘system’. Demographic behaviour will adapt to a situation of high pressure (low employment and low real wages, land scarcity) as much as to one of low pressure (land abundance and high real wages). The interaction between real wages and age of marriage will tend to stabilize the economy at a relatively high equilibrium, helping to explain the relatively high income levels earned in the region between the Black Death and the Industrial Revolution.

These supplementary perspectives on the EMP are relevant for understanding what went wrong with the attempt by D&O to test the hypothesis that EMP contributed to the economic development of Western Europe before the Industrial Revolution. They assume that the EMP is a system with high average age of marriage of women, a large share of singles and nuclear (non-complex) households, and that the degree to which these features appear makes a country more EMP-ish. To begin with, we have serious reservations about the coverage and the quality of the data used, the weights used, and more generally, how data have been processed to get the country-wide averages they present and analyse. But we did not get access to their dataset for reasons which remain rather unclear. We regret this, and think this conflicts with the open access and data availability policies adopted by leading academic

institutions and journals (including Journal of Economic History), and more generally, with good academic practices.

However despite this obstacle we do have some specific criticisms of the way that the data in the Dennison and Ogilvie database have been used. For some countries the observations in given years are based on a few, even solitary observations. Of the 40 regional units they cover, over a quarter have 10 observations or less for female age at first marriage.<sup>2</sup> They also do not seem to have weighted the observations for the population density of a given region to come to a national value. The earlier, working paper version of the paper presented a more complete set of summary statistics than the currently published paper does, but it is unclear what has changed between the calculations in the working paper and those in the final version. Their paper presents a far-ranging, but at the same time patchy, summary of the numbers available in the literature. However they do not appear to cover the proliferation in recent years of databases of demographic information at the individual level, often made available via websites (such as the Mosaic, Napp and Ipums, and the EHPS network).<sup>3</sup>

More importantly, however, is that their interpretation of the data is based on a serious misunderstanding of the literature. Perhaps it is possible to interpret Hajnal's version of the EMP as arguing that the EMPishness of a country increases with the average age of marriage and the share of singles in the population (although such an interpretation is already doubtful). But as D&O wish to test hypotheses from the recent literature about the consequences of the EMP for economic development, this 'simple' interpretation is plainly wrong. The key issues is that the average age of marriage is the result of two factors: whether or not marriage is based on the underlying institutions analysed in the Girlpower paper (primarily consensus and neo-locality), and the standard of living of the population, potentially resulting in further postponement of marriage. If an economy is highly successful in generating economic growth and rising standards of living thanks to, (a.o.) the EMP, this will result in relatively low ages of marriage – that is, low within the context of marriage behaviour based on consensus, i.e. around 20 years. This was the situation in the late Middle Ages after the Black Death, when (we argue) consensus became the norm for large parts of the population of North Western Europe, but real wages and employment opportunities were such that it was relatively easy to marry. The available data show an average age of marriage of 18-21 years for both England and Holland (De Moor and Van Zanden 2010, pp. 16-17; Dennison and Ogilvie 2014, p. 662, also find a significant lower age of marriage for the 16th century). The 16th century price inflation brought an end to this favorable situation – although real wages in the Netherlands and England declined less than those elsewhere in Western Europe, they did go down. There is substantial evidence pointing to a strong rise in age of marriage during the 16th century – not because marriage institutions became more EMPish (which they did not, in fact the Reformation and the Counter-Reformation strengthened the position of parents), but due to the increase of economic stress resulting in the deterioration of living standards.<sup>4</sup> From our

---

<sup>2</sup> Croatia, Belarus, Baltics, Iceland, Italy (all), Malta, Romania, Serbia, Slovakia, Slovenia, Spain (all), Ukraine

<sup>3</sup> See for an overview of datasets: <http://www.ehps-net.eu/databases>

<sup>4</sup> Dennison and Ogilvie 2013 also present 15<sup>th</sup> century evidence that points in the same direction: the average age of marriage of the 15<sup>th</sup> century studies is 18,8 years, for the 16<sup>th</sup> century this is 21,8 years and for the 17<sup>th</sup> century

agency-based perspective the rise in age of marriage due to the decline in real wages in the 16th century was not a strengthening of the EMP, but a weakening.

A similar example can be derived from the emigration experience of men and women in early modern Europe. When emigrants from the North Sea area settled in the Cape Colony or North America, they did not change their values and norms concerning marriage behaviour (consensus remained the central notion), but they soon began to marry much earlier due to the different economic circumstances, because in these parts of the world land was abundant and real incomes were relatively high. In the Cape Colony, for example, mean age of marriage for women was as low as 19-20 years during the 18th century (perhaps it is not a coincidence that this is comparable to the level found in late Medieval Europe) (Cilliers 2013).

In other words, women's average age of marriage is influenced by both the economic circumstances and the underlying institutions. The introduction of the consensus marriage must have resulted in a strong rise of the age of marriage (say from 12-16 years to 18-30 years), but within the EMP a lot of variation was possible, dependent on the employment prospects and the real incomes of the working population. The other indicators (share of singles and of complex households) used by D&O suffer from the same problems: they are endogenous and measure both the presence of the institutions underlying the EMP and the large degree of variation within the EMP. It is therefore no accident that D&O do not find a correlation between economic growth and marriage ages – it is exactly what we would expect. Economically successful regions with EMP institutions will have relatively lower marriage ages than stagnating EMP regions. The growth spurt that began in England after 1650 and that brought about the Industrial Revolution of the late 18th century, resulted in a long term decline of marriage ages, whereas at the same time, when the 'Golden Age' of Holland turned into a 'silver' 18th century, ages of marriage went up (Wrigley and Schofield 1981; Van der Woude 1980).

### **3. Testing the EMP hypothesis**

That D&O came to an incorrect conclusion, does not imply, in our view, that the question about the long term economic effects of the EMP is not right. But how can we test the hypothesis that the EMP affected economic growth before 1800? Obviously, we have to focus on the underlying institutions, and try to measure them, but that is not an easy job. In the paper 'Towards an ethnographic understanding of the European Marriage Pattern' Sarah Carmichael and Jan Luiten van Zanden (2015) have tried to do this. They have redefined the EMP in ethnographic terms, and 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

---

24,8 years, confirming the rise in age of marriage during the period in which real wages decline steeply; see for this link also Wrigley and Schofield (1981).



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 ‘girlfriendly index’**

Variable	Lowest Score	Intermediate Scores	Highest Score
Domestic Organisation	Extended – 0	Stem – 0.5	Nuclear – 1
Cousin Marriage	Endogamy – 0 <sup>5</sup>		Exogamy – 1
Monogamy	Polygamy – 0		Monogamy – 1
Marital residence	Patrilocal and Virilocal – 0	Avunvulocal – 0.25 Ambilocal – 0.5 Neolocal – 0.75	Matrilocal - 1
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.<sup>6</sup> It contains data on 1267 societies for a wide range of characteristics. 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.<sup>7</sup>

Using this index, the ‘girlfriendliness’ 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 favour female agency. It is a bit arbitrary to weight all institutions in the same way, but we do not have a method to differentiate the impact of different marriage and family related institutions. This results in the map 1 presented below, showing that Europe to the west of the Hajnal line is clearly very ‘girlfriendly’, but so is South-East Asia (in Carmichael and Van Zanden (2015) qualitative information confirming this pattern is presented). When looking more closely, they find that in the other margins of the EurAsian landmass – in south India (Kerala is a famous

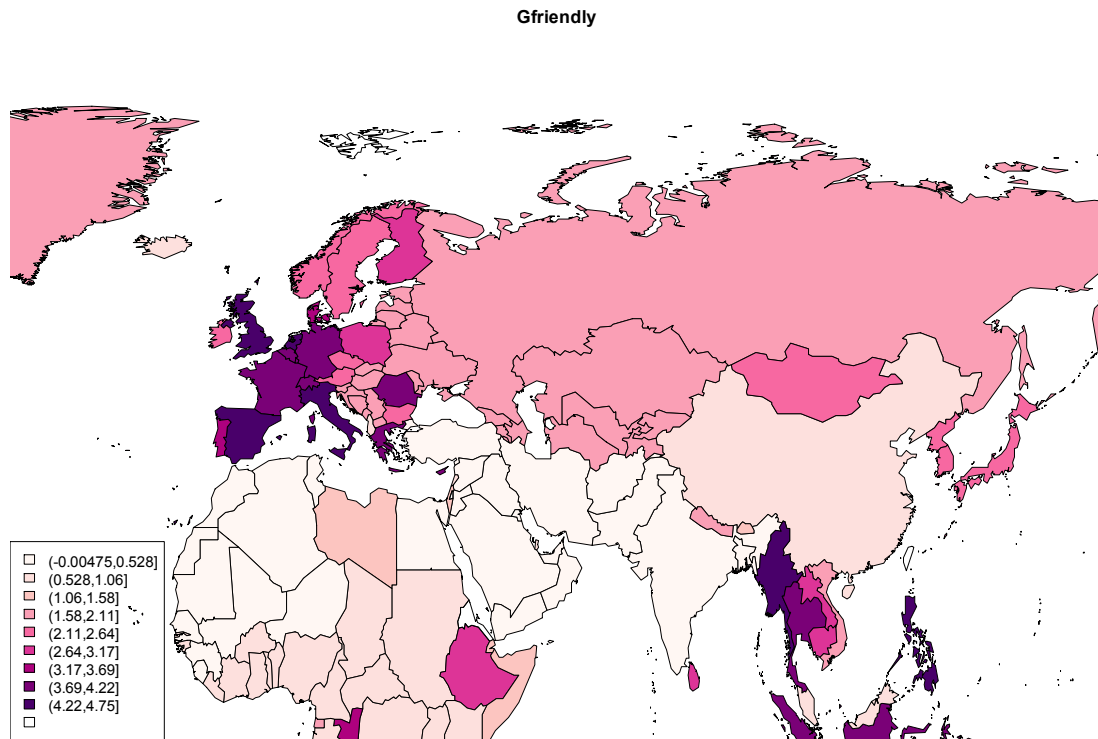
<sup>5</sup> Assigning a score to the extended family variable and the endogamy is complicated as in some cases living in extended, endogamous families can be beneficial to women as it keeps their natal kin close-by and can provide them with a support mechanism in times of need. An argument could therefore 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).

<sup>6</sup> A revised Ethnographic Atlas was used that has been published by the *World Cultures* journal: <eclectic.ss.uci.edu/~drwhite/worldcul/world.htm>. The data is available at <intersci.ss.uci.edu/wiki/pub/XC/EthnographicAtlasWCRevisedByWorldCultures.sav>.

<sup>7</sup> For further details on the derivation of country level variables and the process of checking and correcting please see Rijpma and Carmichael (2015).

case), Sri Lanka, Japan, marriage systems also allow for female agency. The map below presents this visually at the country level for Eurasia.

**Figure 1: Girlfrendliness 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); the methodology is 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 the reconstruction of the ‘girlfriendly’ index. Their results, averaged at the country level, correlate strongly, but obviously negatively, with our index ( $R^2 = .53$ ).<sup>8</sup> 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, the girlfriendly index is highly correlated with contemporary measures of gender inequality,

<sup>8</sup> Here the Turkish sample has been excluded as it is based solely on Istanbul. Similarly Italy is based on only one location (Legano) in 1430, and therefore has also been left out of this correlation.

although the correlation is far from perfect ( $R^2=.33$ ); Sweden, for example, is currently world leader in gender equality, but did not score very well on the girlfriendly index.

We think this measure for female agency within the family system is a good proxy for testing the Girlpower version of the EMP hypothesis, as it is clearly based on the underlying institutions. We focus on the question of whether this index can help to explain the Little Divergence within Europe, which is (implicitly) also the issue addressed by D&O. In another paper, De Pleijt and Van Zanden (2013) have tested the various hypotheses for explaining the divergent development of the North Sea area between 1300 and 1800. The results of that paper indicate that political institutions and human capital formation were the main underlying causes of economic growth in this period. We add to this analysis here by directly testing the EMP-Girlpower hypothesis, building on the results of that paper.<sup>9</sup>

The key independent variable in our regression is the girl-friendliness index which shows substantial differences between European countries: North-western Europe, notably England and The Netherlands, had institutions favouring more female agency than countries located in Southern- and Central-Europe. We regress this on two sets of dependent variables. First, the latest estimates of per capita GDP for these European countries in the period 1300-1800 (Bolt and Van Zanden (2014) for an overview). Secondly, to evaluate the robustness of our results, we follow earlier studies (e.g., Acemoglu et al. 2005; Bosker et al. 2013) by taking the urbanization ratio as an alternative dependent variable.

The unit of observation are countries at intervals of approximately a century. The years included are 1300, 1400, 1500, 1600, 1700, 1750 and 1800. Observations for 1300 and 1400 are only available for Spain, Italy, England and the Netherland. Germany, France, Austria, Poland, Belgium, Switzerland, Denmark, Ireland and Norway enter the dataset in 1500; Sweden and Portugal enter the sample in 1600. The girl-friendliness index is related to per capita GDP and the urbanisation ratio by estimating the following simple linear regression model:

$$\ln Y_{it} = \alpha_i + \alpha_t + X_{it}\beta + \gamma_1 GF_i + \varepsilon_{it} \quad (1)$$

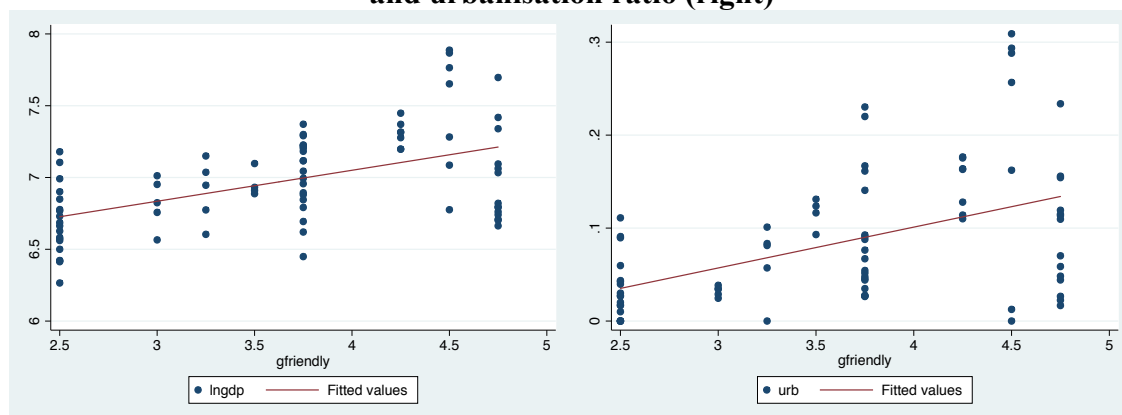
where  $Y_{it}$  denotes GDP per capita or the urbanisation rate of country  $i$  in century  $t$ ,  $GF_i$  is our main variable of interest, the girl-friendliness index.  $X_{it}$  is a vector of control variables related to economic development,  $\alpha_i$  is the country-specific effect, and  $\alpha_t$  denote the century specific effects. We include a full set of country and century dummies to allow for unobserved country-specific as well as century-specific heterogeneity.  $\varepsilon_{it}$  captures all other unobserved (or unmodelled) variables related to economic growth, and we assume that it is uncorrelated with the girl-friendliness index. Standard errors are clustered at the country level to control for serial correlation in the unobservables.

---

<sup>9</sup> In De Pleijt and Van Zanden (2013) we have performed Random-Effect/Two-Stage least-square regressions, whereas in this paper we have estimated a linear regression model.

Figure 2 shows the basic correlation between the girl-friendliness index and per capita GDP (left panel) and urbanisation ratios (right panel). The Figure nicely illustrates a strong positive relationship between the two: countries with female friendly institutions were also the ones with the highest levels of per capita GDP and urbanisation.

**Figure 2: Basic correlation between girlfriendly index and log of GDP per capita (left) and urbanisation ratio (right)**



Notes and sources: See main text.

Table 2 presents the baseline estimation results including the set of country and century dummies. The regression results in Column (1) suggest a strong and positive effect of female friendly institutions on per capita GDP (denoted Ln GDP): the coefficient on the girl-friendliness index is highly significant at the 1% level. Column (2) shows that this result is robust to the use of the urbanisation ratio as left-hand side variable (denoted URB). The coefficients on the index again enter with the expected sign and are statistically significant.

**Table 2: Female agency and economic development 1300-1800**

Estimator Dependent variable	(1) OLS Ln GDP	(2) OLS URB
Girl-friendliness index	0.22*** (0.03)	0.05*** (0.01)
Century dummies	YES	YES
Country dummies	YES	YES
Constant	6.05*** (0.25)	-0.22*** (0.07)
R2	0.78	0.81
No. of observations	81	81

Notes: Standard errors are clustered at the country level to control for serial correlation in the unobservables. Standard errors in parentheses. \*, \*\*, \*\*\* denote significance at the 10%, 5%, 1% level respectively.

To check for the robustness of our results, the next step is to control for other important determinants of economic growth. The control variables capture the development of political

institutions, the role of international trade and shipping, the spread of Protestantism, and the incidence of warfare. We now turn to a brief discussion of the various variables that we include.

Research stresses the importance of political institutions in ‘constraining the executive’ as a root cause for early modern growth (cf. North and Weingast 1989; Acemoglu and Robinson 2012). To proxy the quality of political institutions, we use the activity index of Parliaments of Van Zanden, Eltjo Buringh, and Maarten Bosker (2012). The activity index is defined as the number of years Parliaments were in session during a century and varies from zero, when no Parliament convened, to 100, when the Parliament met every year during a given century. The idea is that in republican systems with a strong Parliament (such as England after the Glorious Revolution of 1688) property rights were more secure than in states ruled by absolutist kings (such as France). Active Parliaments, constraining the actions of the sovereign, are therefore expected to have contributed to economic development between 1300 and 1800.

As a second variable capturing political institutions, we include the share of cities with self-government (Bosker et al. 2013). The communal movement that started in the 11th and 12th centuries is important for economic growth as it created a stable system of property rights in cities (Stasavage 2014). Between 1100 and 1500 many European cities obtained city rights, but they could also lose their status as a result of conquest by another city or by the abolishment of the independent status by absolutist rulers. The share of cities with self-government is therefore argued to proxy the ‘republican’ nature of the polity as self-government constraints the executive.

Another body of literature stresses the significant contribution of international trade and shipping to pre-industrial development (e.g., Allen 2003; Acemoglu et al. 2005). To measure the impact of international trade on per capita GDP and urbanisation we make use of the tonnage size of the merchant fleet (De Pleijt and Van Zanden 2013). This measure has the advantage that it is available for a large set of European countries and a long period of time. Moreover to account for the contribution of colonies to economic growth (Acemoglu et al. 2005; Pedreira 1993; Daudin 2004), we introduce ‘Colonial Realm’ in the regressions. This variable captures the size of the colonial population compared to the population of the colonizing country (Bosker et al. 2013).

To control for the effect of religion on growth, we include a dummy variable for Protestantism. The variable equals 1 for countries that became more or less fully protestant after the Reformation; it takes value 0.5 for states that were about 50% protestant; and, finally, it equals 0 for countries that remained fully catholic. Since it is strongly related to human capital formation (Becker and Woessmann 2007; De Pleijt and Van Zanden 2013), we also include the number of universities per capita in the regressions (Van Zanden et al. 2012). The number of universities per capita may also directly have contributed to economic progress, as it measures advanced levels of human capital (De Pleijt and Van Zanden 2013).

A final set of control variables included in the regressions is related to the effect of warfare. Research has found an important effect of war on state formation and subsequent economic development (Tilly 1990; Voth and Voigtländer 2012). We therefore first of all add the average years of war during the previous period (a century or half-century) (Acemoglu et al. 2005). Secondly, we control for the Thirty Years' war by including a dummy variable that equals 1 for Germany during the century after the war (Baten and Van Zanden 2008).

**Table 3: Female agency and economic development 1300-1800: Controlling for other determinants of economic development**

Estimator Dependent variable	(3) OLS Ln GDP	(4) OLS URB
Girl-friendliness index	0.25*** (0.07)	0.05* (0.03)
Ln Parliamentary	0.09*** (0.03)	0.01* (0.00)
Share cities self-government	0.85*** (0.15)	0.16** (0.07)
Ln size of merchant fleet	0.00 (0.00)	0.00 (0.00)
Colonial Realm	0.04 (0.06)	0.03* (0.02)
Protestantism	0.10 (0.10)	0.03 (0.03)
No of universities p/c	-0.09 (0.12)	-0.01 (0.03)
Years at war	-0.04 (0.06)	0.02* (0.01)
Thirty Years' war	-0.10** (0.05)	-0.02* (0.01)
Century dummies	YES	YES
Country dummies	YES	YES
Constant	5.84*** (0.28)	-0.21* (0.11)
R2	0.91	0.92
No. of observations	81	81

Notes: Standard errors are clustered at the country level to control for serial correlation in the unobservables. Standard errors in parentheses. \*, \*\*, \*\*\* denote significance at the 10%, 5%, 1% level respectively.

Table 3 reports on the regressions including the set of control variables. Although the standard errors become slightly larger, the coefficient on the girl-friendliness index never becomes statistically insignificant. Interesting is the finding of a strong relation between political intuitions and our measures of economic development: the coefficients on the Parliamentary activity index and on the share of cities with self-government enter with correct sign and are highly significant in all regressions. Regarding international trade, the coefficient on the size of the merchant fleet is insignificant, suggesting that female agency and political institutions were more important drivers of economic growth between 1300 and 1800. The regression in Column (4) however suggest a positive relationship between colonial realm and urbanisation, which indicates that the growth of overseas land contributed to city growth. Although Protestantism enters with the correct sign, it is never found to be significant in the regressions. This finding suggests that religion had no direct effect on economic outcomes, but that it worked via other channels such as human capital formation (Baten and Van Zanden 2008; Becker and Woessmann 2007; De Pleijt and Van Zanden 2013). With respect to warfare, we indeed find a weak negative effect of the Thirty Years' war on economic growth in Germany. The outcome reported in Column (3) furthermore show that average years of war did not contribute to per capita GDP; it was, however, positively related to the process of urbanisation (Column (4)), which adds evidence to the hypothesis of Voth and Voigtländer (2012) stressing the importance of this relationship.

#### **4. Conclusion**

Dennison and Ogilvie have in our view misunderstood the EMP hypothesis about the relationship between this family system and economic development. Hajnal does not postulate that there is a simple, linear relationship between the basic features of the family system (age of marriage, share singles, and share of complex households) and economic development. It is immediately clear from the fact the (for example) age of marriage is also determined by the standard of living of the population, that this relationship is not linear. So their failure to find a clear link between these features and economic development is exactly what might be expected. In addition, we have suggested a proper test of the link between the EMP and economic development in early modern Europe, starting from the alternative interpretation of the EMP as a system that allows a lot of female agency (as already suggested in the paper on 'Girlpower'). Making use of recent estimates of GDP per capita and urbanization (and a series of control variables), we show that there was a strong, consistent link between female-friendly institutions at the micro level and economic performance, thereby confirming our version of the EMP hypothesis.

## References:

- Acemoglu, Daron, James A. Robinson, and Dan Woren. *Why Nations Fail: The Origins of Power, Prosperity and Poverty*. New York: Crown Business, 2012.
- Acemoglu, Daron, Simon Johnson, and James Robinson. "The Rise of Europe: Atlantic Trade, Institutional Change, and Economic Growth." *American economic review* 95, no.3 (2005): 546-579.
- Allen, Robert C. "Progress and Poverty in Early Modern Europe." *The Economic History Review* 56, no. 3 (2003): 403-443.
- Baten, Joerg, and Jan Luiten van Zanden. "Book Production and the Onset of Modern Economic Growth." *Journal of Economic Growth* 13, no. 3 (2008): 217-235.
- Becker, Gary S. "An Economic Analysis of Fertility." In *Demographic and economic change in developed countries*, 209-40. New York: Columbia University Press, 1960.
- \_\_\_\_\_. "A Theory of the Allocation of Time." *The economic journal* 75 (1965): 493-517.
- Becker, Gary S., and H. Gregg Lewis. "On the Interaction between the Quantity and Quality of Children." *The Journal of Political Economy* 81 (1973): S279-S288.
- Becker, Gary S., and Nigel Tomes. "Child Endowments, and the Quantity and Quality of Children." *The Journal of Political Economy* 85, no. 4(2) (1976): S143-S162.
- Becker, Sascha O., and Ludger Woessmann. "Was Weber Wrong? A Human Capital Theory of Protestant Economic History." *Quarterly Journal of Economics* 124 (2007): 531-96.
- Becker, Sascha O., Francesco Cinnirella, and Ludger Woessmann. "The Trade-Off between Fertility and Education: Evidence from before the Demographic Transition." *Journal of Economic Growth* 15, no. 3 (2010): 177-204.
- Bolt, Jutta. "Quantifying Pre-Colonial Institutions in Africa: Assessing the Reliability of the Ethnographic Atlas." Working Paper, University of Groningen, 2012.
- Bolt, Jutta, and Jan Luiten van Zanden. "The Maddison Project: Collaborative Research on Historical National Accounts." *The Economic History Review* 67, no. 3 (2014): 627-651.
- Bosker, Maarten, Eltjo Buringh, and Jan Luiten van Zanden. "From Baghdad to London: Unraveling Urban Development in Europe, the Middle East, and North Africa, 800–1800." *Review of Economics and Statistics* 95, no. 4 (2013): 1418-1437.



- Brown, Susan L. "Family Structure Transitions and Adolescent Well-Being." *Demography* 43, no. 3 (2006): 447-461.
- Carmichael, Sarah., Tine De Moor, and Jan Luiten van Zanden. "Introduction." *History of the Family* 16, no. 4 (2011): 309-311.
- Carmichael, Sarah, and Jan Luiten van Zanden. "Towards an Ethnographic Understanding of the European Marriage Pattern: Global Correlates and Links with Female Status". *Population Histories in Context* (forthcoming). Currently online available as CGEH Working Paper no. 67, 2015.  
[http://www.cgeh.nl/sites/default/files/WorkingPapers/cgehwp67\\_carmichaelvanzanden.pdf](http://www.cgeh.nl/sites/default/files/WorkingPapers/cgehwp67_carmichaelvanzanden.pdf)
- Cilliers, Jeanne. "Cape Colony Marriage in Perspective." Ph.D. diss., Stellenbosch University, 2013.
- Clark, Gregory. *A Farewell to Alms. A brief economic history of the world*. Princeton: Princeton UP, 2007.
- Currie, Janet, and Enrico Moretti. "Mother's Education and the Intergenerational Transmission of Human Capital: Evidence from College Openings." *The Quarterly Journal of Economics* 118, no. 4 (2003): 1495-1532.
- Daudin, Guillaume. "Profitability of Slave and Long-Distance Trading in Context: The Case of Eighteenth-Century France." *The Journal of Economic History* 64, no. 1 (2004): 144-171.
- De Moor, Tine, and Jan Luiten van Zanden. "Girl power: The European Marriage Pattern and Labour Markets in the North Sea Region in the Late Medieval and Early Modern Period." *The Economic History Review* 63, no. 1 (2010): 1-33.
- De Pleijt, A. and Jan Luiten van Zanden. 2013. "Accounting for the 'Little Divergence' What drove Economic Growth in Preindustrial Europe, 1300-1800?." CGEH Working Paper no. 46, 2013.  
[http://www.cgeh.nl/sites/default/files/WorkingPapers/CGEHWP46\\_depleijtvanzanden\\_0.pdf](http://www.cgeh.nl/sites/default/files/WorkingPapers/CGEHWP46_depleijtvanzanden_0.pdf)
- Dennison, Tracy, and Sheilagh Ogilvie. "Does the European Marriage Pattern Explain Economic Growth?" *The Journal of Economic History* 74, no. 03 (2014): 651-693.
- Dilli, Selin, Sarah Carmichael, and Auke Rijpma. "Gender Equality in Historical Perspective: Introducing the Historical Gender Equality Index." *Feminist Economics* (forthcoming).

- Edwards, Jeremy, and Sheilagh Ogilvie. "Contract Enforcement, Institutions, and Social Capital: The Maghribi Traders Reappraised." *The Economic History Review* 65, no. 2 (2012): 421-444.
- Engelen, Th LM, and Arthur P. Wolf. *Marriage and the Family in Eurasia. Perspectives on the Hajnal hypothesis*. Amsterdam: Aksant, 2005.
- Greif, Avner. *Institutions and the Path to the Modern Economy: Lessons from Medieval Trade*. Cambridge: Cambridge University Press, 2006.
- Gruber, Siegfried, and Mikołaj Szoltysek. "The Patriarchy Index: A Comparative Study of Power Relations across Historical Europe." *The History of the Family*, ahead-of-print (2015): 1-42.
- Hajnal, John. "European Marriage Patterns in Perspective." In *Population in History: Essays in Historical Demography*, edited by D. Glass and D. Eversley, 101-43. Chicago: Aldine, 1965.
- Laslett, Peter, and Richard Wall. *Household and Family in Past Time*. Cambridge: Cambridge University Press, 1972.
- Mason, Karen. "Gender and Family Systems in the Fertility Transition." *Population and Development Review* 27 (2001): 160-176.
- Murdock, George Peter. *Ethnographic Atlas*. Pittsburg: University of Pittsburgh Press, 1967.
- North, Douglass C. *Structure and Change in Economic History*. New York: Norton, 1981.
- North, Douglass C., and Barry R. Weingast. "Constitutions and Commitment: The Evolution of Institutions Governing Public Choice in Seventeenth-Century England." *The journal of economic history* 49, no. 4 (1989): 803-832.
- North, Douglass C., John Joseph Wallis, and Barry R. Weingast. *Violence and Social Orders: A Conceptual Framework for Interpreting Recorded Human History*. Cambridge: Cambridge University Press, 2009.
- Ogilvie, Sheilagh. "'Whatever is, is Right'? Economic Institutions in Pre-Industrial Europe." *The Economic History Review* 60, no. 4 (2007): 649-684.
- \_\_\_\_\_. "Rehabilitating the Guilds: a Reply." *The Economic History Review* 61, no. 1 (2008): 175-182.
- \_\_\_\_\_. *Institutions and European trade: Merchant guilds, 1000–1800*. Cambridge: Cambridge University Press, 2011.

- Pedreira, Jorge M. "La economía portuguesa y el fin del imperio luso-brasileño." In *La independencia americana: consecuencias económicas*, edited by L. Prados de la Escosura and S. Amaral, 219-252. Madrid: Alianza Editorial, 1993.
- Rijpma, Auke and Sarah Carmichael. "Testing Todd and Matching Murdock: Global Data on Family Characteristics". *Economic History of Developing Regions* (forthcoming). Currently online available as CGEH Working Paper no. 70, 2015.  
[http://www.cgeh.nl/sites/default/files/WorkingPapers/cgehwp70\\_rijpmacarmichael.pdf](http://www.cgeh.nl/sites/default/files/WorkingPapers/cgehwp70_rijpmacarmichael.pdf)
- Rosenzweig, Mark R., and Junsen Zhang. "Do Population Control Policies Induce more Human Capital Investment? Twins, Birth Weight and China's "One-Child" Policy." *The Review of Economic Studies* 76, no. 3 (2009): 1149-1174.
- Rosenzweig, Mark R., and Kenneth I. Wolpin. "Testing the Quantity-Quality Fertility Model: The use of Twins as a Natural Experiment." *Econometrica: journal of the Econometric Society* 48, no. 1 (1980): 227-240.
- Schultz, Theodore W. "Investment in Human Capital." *The American economic review* 51 (1961): 1-17.
- Stasavage, David. "Was Weber Right? The Role of Urban Autonomy in Europe's Rise." *American Political Science Review* 108, no. 2 (2014): 337-354.
- Teignier, Marc and David Cuberes. "Aggregate Costs of Gender Gaps in the Labor Market: A Quantitative Estimate." UB Economics Working Paper no. E14/308, 2014.  
<http://ssrn.com/abstract=2405006>.
- Tilly, Charles. *Coercion, Capital, and European States, AD 990-1992*. Cambridge: Basil Blackwell, 1990.
- Todd, Emmanuel. *The Explanation of Ideology: Family Structures and Social Systems*. Oxford: Blackwell, 1985.
- \_\_\_\_\_. *The Causes of Progress: Culture, Authority and Change*. Oxford: Blackwell, 1987.
- Van der Woude, A. M. 'Demografische ontwikkeling', *Algemene Geschiedenis der Nederlanden* 5 (1980): 141-144.
- Van Zanden, Jan Luiten, Eltjo Buringh, and Maarten Bosker. "The Rise and Decline of European Parliaments, 1188–17891." *The Economic History Review* 65, no. 3 (2012): 835-861.

Vogl, Tom. “Differential Fertility, Human Capital, and Development”. NBER Working Paper no. w19128, Cambridge: National Bureau of Economic Research, 2013.

Voigtländer, Nico, and Hans-Joachim Voth. “How the West 'Invented' Fertility Restriction.” NBER Working Paper no. w17314, Cambridge: National Bureau of Economic Research, 2011.

World Bank. *Gender Equality and Development World Development Report 2012*. Washington DC: The World Bank, 2011.

Wrigley, Edward Anthony, and Roger S. Schofield. *The Population History of England, 1541-1871: A Reconstruction*. Cambridge: Harvard University Press, 1981.