# Historical family systems and contemporary developmental outcomes: what is to be gained from the historical census microdata revolution?

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# Historical family systems and contemporary developmental outcomes: what is to be gained from the historical census microdata revolution?

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## ABSTRACT

Recent years have witnessed a growing interest in the role of the historical family as the instigator of disparate developmental trajectories. However, a major challenge faced by these studies was that they had to work around a lack of reliable historical data. This study demonstrates how embarking on the recent outburst of historical microdata infrastructures may help to improve these explorations by suggesting additional statistics and a derived measure (the Patriarchy Index) that might prove useful in future efforts aimed at assessing the effect of historical family organization on comparative development. The added value of that endeavour is assessed by comparing the predictive validity of the PI for contemporary developmental gradients against a composite indicator of family organization previously used by economic historians (Carmichael's 'Female Friendliness Index'). The results indicate that conclusions about the relationship between historical family organization and various societal outcomes may be sensitive to the measure used. Based on the evidence presented in this paper, it is argued that one of the reasons why the potential importance of historical family for contemporary developmental disparities has not been convincingly unravelled could be inadequacy of data and indicators so far employed to assess historical family formations. To the extent that the Patriarchy Index would be taken up by wider scholarly circles as an indicator of historical family organization it could help unravel potentially new associations between past and present, at least as far as Europe is concerned.

## 1. Introduction

The vast bulk of historical demographic literature has viewed the family as a relatively passive unit affected by exogenous changes in standards of living, environmental vicissitudes, or political-economic upheavals (Szołtysek, 2014). However, a much overlooked possibility in these discussions is that linkages between family systems and various societal domains might have also run in a reversed direction, i.e. from the family

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to the outer world. The notion that family systems could have had an impact on wider societal outcomes has a long pedigree. Max Weber, for example, alluded to it when he argued that strong family values do not allow for the development of individual forms of entrepreneurship, which are fundamental to the formation of capitalist societies (Weber, 1904; also Banfield, 1958; Nimkoff, 1965, p. 61 ff). Much later, after it had been shown that the nuclear family structure had been the dominant family type in England long before any industrial development occurred, some scholars argued that the dominance of the nuclear family was among the necessary pre-conditions for modernization and industrialization (Laslett, 1983; Macfarlane, 1987). These far-reaching surmises had never been comprehensively tested, and soon the whole matter was forgotten.

In the last few years, however, these ideas have regained prominence in the New Institutional Economics after scholars have re-discovered the importance of the family as the grassroot institution of society (see Alesina and Giuliano, 2010; earlier Sen, 1983; see also Mason, 2001; Carmichael, Dilli, & Van Zanden, 2016a; Kok, 2017). For example, in a recent series of papers, Alesina and Giuliano (2010, 2014) have shown that the strength of family values across the world is negatively associated with a wide range of societal attitudes related to productivity and growth, as well as political participation, levels of trust and attitudes towards gender hierarchies (earlier, Bertrand & Schoar, 2006; also Kick, Davis, Lehtinen, & Wang, 2000; Daniele & Geys, 2016).[1] Inspired by these insights, as well as by a growing recognition that human development can be affected by persistent historical traits (Nunn, 2009; Spolaore & Wacziarg, 2013), an increasing number of economic history works has incorporated past familial behaviour into explanations of developmental divergences within Europe and beyond (e.g. Greif, 2006; Duranton, Rodríguez-Pose, & Sandall, 2009; De Moor & Van Zanden, 2010; Foreman-Peck, 2011; Dennison & Ogilvie, 2014, 2016; Bertocchi & Bozzano, 2015; Carmichael et al., 2016a; Rijpma & Carmichael, 2016; Carmichael & Rijpma, 2017; Dilli, 2017; Le Bris, 2016; Szołtysek, Poniat, Klüsener, & Gruber, 2017a; Santos Silva, Alexander, Klasen, & Welzel, 2017; earlier also Reher, 1998; Therborn, 2004). Given the sheer complexity of the problem at stake, it is not surprising that this new emerging literature has already provoked a considerable amount of controversy, involving debates on the precise underlying mechanisms, the role of non-familial institutions and the possibility of reversed causality (Dennison & Ogilvie, 2014, 2016; Carmichael, De Pleijt, Van Zanden, & De Moor, 2016b). However, a major challenge faced by all previous studies was that they had to work around a lack of reliable historical data. The consequent reliance on the 'cultural ideal' family types derived from data of oftentimes uncertain quality has resulted in linking the developmental statistics to crude classifications of historical family systems, the spatial and multidimensional nature of which were considered only selectively. Recognizing these challenges, Carmichael et al. (2016b, p. 200) recently suggested that the role of historical family in comparative development requires to be re-examined with the use of newly-available historical demographic databases.

We respond to this plea by critically examining the measures of historical family systems employed in the previous family-development literature and showing how embarking on the recent outburst of historical microdata may help to improve them. These emerging opportunities are illustrated by constructing a database of European family patterns over the last few hundred years using information from the Mosaic and the North Atlantic Population projects – the largest existing historical census microdata

depots recently made available. We use these data to develop a composite measure of familial organization in historic Europe (the Patriarchy Index; henceforth PI) which allows for a multidimensional operationalization of historical family systems that has not been possible before. This measure, which builds on a massive repository of historical data on local family practices, is then used through a bottom-up aggregation to yield historical patriarchy scores for 26 contemporary European countries. The added value of the PI is assessed by comparing its predictive validity for contemporary developmental gradients against a composite indicator of family used previously by economic historians (Carmichael's 'Female Friendliness Index'; henceforth FFI).

We make two major points. First, conclusions about the impact of family organization on social outcomes are sensitive to the measures one uses and that sensitivity has not received the attention it warrants. Second, we show there is much to be gained from considering a broader range of indicators of historical family patterns than has been used thus far. More specifically, we argue in favour of the PI as a preferred measurement tool and demonstrate that its usage is likely to increase the explanatory or predictive power of our models and may unravel new associations between past and present, at least as far as Europe is concerned. Given that indexing historical patriarchy may be difficult for non-European societies, we separately evaluate the FFI as a global rather than European measure of family relations. By this token, we highlight the strengths of family and economic history working together to provide more comprehensive and robust frameworks for future research.

The remainder of this paper is divided into six parts. First, we provide a brief overview of the research on the links between historical family patterns and current outcomes and discuss problems associated with these earlier approaches. We then present our own data and methodology. In the core parts of the paper, we examine degrees of covariation between the two focal measures of historical family and selected contemporary indicators using cross-country correlations.[2] In the penultimate section, we complement these exercises with an assessment of the predictive power of the FFI at varying spatial scales. We conclude by summarizing our findings.

## 2. Previous literature

The idea that the axial principles of family and household organization can spill over to higher levels of organization as societies evolve has gained momentum owing to two distinct contributions. In 'Family ties in Western Europe', Reher (1998) posited that spatially bounded historical family patterns continue to exist contemporaneously, and suggested that those 'familial geocultures' may themselves have implications for the way society itself functions (Reher, 1998, p. 215; similarly Therborn, 2004). More recently, De Moor and Van Zanden (2010; also Greif, 2006; Foreman-Peck, 2011) re-introduced earlier suggestions of Laslett by positing that the historical north-western European marriage and family pattern (based on late marriage, neolocality, and high levels of lifetime celibacy among women; henceforth EMP) could be a key factor not only in the economic success of northern and western Europe relative to southern and eastern Europe, but also in the 'great divergence' between Europe and the rest of the world ('the Girl Power hypothesis').

These propositions, however, contained little large-scale empirical tests due to the major difficulty of finding historical data that would be at the same time detailed and global to empirically anchor the authors' arguments. Although historical family has been at the centre of scholarly interest for generations of scholars, the efforts undertaken until very recently have not produced data infrastructures that would allow for an omnibus reconstruction of historical family patterns in Europe, least beyond it. To circumvent this *impasse*, an increasing number of researchers has been taking recourse to a world-wide classification of family systems inferred from anthropological evidence by Todd. Todd (1985, 1987) divided all countries of the world on the basis of three indicators, combinations of which he argued make up a family system: the practice of living in complex or nuclear households, whether cousin marriage is practiced, and whether there is partible inheritance between brothers. By combining these measures he developed strict categories and used them to distinguish four major types of family organization at the country level: the exogamous communitarian family, the authoritarian family, the egalitarian nuclear family, and the absolute nuclear family, all showcasing deep historical roots in their geographical distribution dating back to mediaeval times. Todd then embarked on a visual comparison between his map of historical family structures and a series of economic, political, and social maps of Europe, claiming that different patterns of family organization explain the diffusion of, or resistance to, a wide array of critical social changes on the continent, including the spread of Protestantism, secularism, and the acceptance and diffusion of communism.

Over the last 10 years or so, Todd's classification of family types has been subjected to immense data 'snooping'.[3] Duranton et al. (2009) regressed various contemporary socioeconomic outcomes on Todd's European classification (although omitting the whole Southeastern and Eastern Europe) and identified a significant and strong association between his family types and regional disparities in household size, educational attainment, social capital, labour participation, sectoral structure, wealth, and inequality.

Le Bris (2016) reworked Todd's classification of families to extract the three family characteristics for 79 modern world countries – a relatively high status of women (versus low status), a strong authority of parents over children (versus freedom of children), a potential inequality among siblings (versus a strict equality among siblings, at least brothers), and subsequently used them to build *the family score*, whose values vary from 0–3. Le Bris' family score was found to be significantly (and robustly) associated with contemporary variation in economic outcomes as measured by GDP across the world sample studied. To reject the potential reverse causality, Le Bris drew on historical anthropology suggesting that 'for most countries, the family type currently observed has been the same for centuries' (p. 4).

The discussion was moved one degree further by Carmichael and colleagues, who developed a series of composite measures meant to capture comparatively historical family organization. First (Rijpma & Carmichael, 2016)[4] combined Todd's classification for Europe and its offshoots with ethnographic data on Sub-Saharan Africa and Eurasia compiled in George Murdock's Ethnographic Atlas,[5] and derived country-values from this hybrid dataset for 178 world societies. Elsewhere (Carmichael, De Pleijt, Van Zanden, & De Moor, 2015, pp. 10–11), using the same data, they built the 'Female-Friendliness Index' (henceforth FFI) classifying the 81 countries of Eurasia on selected marriage and

**Table 1.** Composition of Carmichael's 'Female-Friendliness Index'.

| Variable | Lowest Score | Intermediate Scores | Highest Score |
| --- | --- | --- | --- |
| Domestic Organisation | Extended: 0 | Stem: 0.5 | Nuclear: 1 |
| Cousin marriage | Endogamy: 0 | | Exogamy: 1 |
| Monogamy | Polygamy: 0 | | Monogamy: 1 |
| Marital residence | Patrilocal and Virilocal: 0 | Avunvulocal: 0.25 | Matrilocal: 1 |
| | | Ambilocal: 0.5 | |
| | | Neolocal: 0.75 | |
| Inheritance | Patrilineal: 0 | Daughters less: 0.5 | Children equally: 1 |
| | | | Other matrilineal: 1 |

*Source*: (De Pleijt, Van Zanden, & Carmichael, 2016); http://www.cgeh.nl/sites/default/files/WorkingPapers/cgehwp79de pleijtetal.pdf

family-related institutions, such as monogamy, marital consensus, female inheritance, exogamy, and neo-locality (see Table 1). Most recently, they presented a modified version of this index (Family Constraints on Women's Agency Index; FCOWA), now covering eight elements of family organization they considered as having an impact on female agency,[6] and again applied it to worldwide data (Carmichael & Rijpma, 2017).

In a series of analyses they found historical family constraints on female autonomy to be significantly and inversely associated with contemporary gender equality outcomes (Rijpma & Carmichael, 2016, p. 38; Carmichael & Rijpma, 2017). They also established a strong and positive effect of 'female friendly' family systems on the historical and present-day estimates of per capita GDP for a range of Eurasian countries. These analyses were complemented by Dilli (2017), who, using the same data, derived a set of dummy variables across 92 world societies measuring male–female equality in inheritance, early versus late marriage pattern, whether a country was characterized with an extended or a nuclear household structure, and whether the country's inhabitants practiced polygamy (Dilli, 2017, pp. 145–146). She found that historical family institutions associated with higher female agency (such as equal inheritance practices, prevalence of nuclear household, late female marriage, and the absence of polygamy) were related to higher levels of economic development in the present.

## 3. Challenges

Apparently, the re-discovery of Todd's worldwide classification carried the promise of a global measure of family variation, but this promise has come at a high price. While the prevalent reliance on Todd has been commonly justified by a general thinness of available historical record, the weaknesses of this approach remain to be clearly acknowledged (cf. Rijpma & Carmichael, 2016, pp. 14–15, 21–22). This is worthwhile doing given that recent inventive attempts to formalize Todd's scheme may perpetuate some of the latter's inherent problems.[7]

For all its undeniable attractiveness (especially its apparently global hatch), Todd's classification displays important deficiencies among which the uncertainty about the empirical sources of his reconstructions, misleading classification of some countries, putting a premium on the 'cultural ideal' rather than actual practice in family behaviours, are likely to be critical for the accuracy of his representations of family patterns (cf. Greenhalgh, 1987). The way Todd constructed his data has been commonly held to originate from inspection of 1960–1970s population censuses, which he confronted with historical record 'to arrive at data that was

meant to capture pre-industrial yet persistent family characteristics' (Rijpma & Carmichael, 2016, p. 14).[8] While this suggests an apparently inductive strategy based on *a posteriori* classification of observable social traits at the country level, upon closer inspection, certain doubts can be formulated regarding Todd's scrutiny in this matter. Relevant examples may include the case of Poland, for whose historical family patterns the information was gathered from contemporary (1978) aggregate census returns supplemented with a superficial summary of the 'Polish culture and its changes in history' (with some general comments on the role of family in the period 1918–1957; see Barnett, 1958) and a speculative essay on the relationship between the manorial economy and family behaviour in *some* parts of early modern Poland (Kula, 1976). Similar qualifiers apply to Todd's assessment of historical family patterns in Albania, which was based on a volume containing short ethnographic reports on 96 Muslim societies in the world (Weekes, 1978). Todd's account of Russia relied primarily on two ethnographic case studies (Dunn & Dunn, 1967; Benet, 1970)[9] whose findings he projected back on a once emblematic case study of the early nineteenth century Russian community (Czap, 1983) which, however, has been found non-representative of the presumed all-Russian family type by more recent scholarship (Dennison, 2003; Polla, 2006). Romanian family patterns Todd inferred from a single monograph by Henri Stahl, who provided a comprehensive picture of the Wallachian agrarian and inheritance patterns in the past, but devoted only little attention to family organization (Stahl, 1980, pp. 42–45). Further examples of Finland (based on one article), as well as Bohemia and Slovakia, complement this generally troublesome picture (Todd, 1985, p. 201 ff.).[10]

Overall, the review of Todd's sources makes clear that his reconstructions lean towards establishing the 'cultural ideal' rather than summarize within-national variation in actual practices at a given time (Popp, 1995; Rijpma & Carmichael, 2016, p. 31).[11] While this feature of Todd's work may not detract from its validity, it does have several fateful implications. First, as an abstract exaggeration of certain aspects of reality (Weber, 1973, p. 191), a 'cultural ideal' easily lends itself to hasty projections of supposed family characteristics back in the distant past. Furthermore, considering that values tend to be noticeably different from the social practices (House, Hanges, Javidan, Dorfman, & Gupta, 2004), one also wonders whether familial 'cultural ideals' are the most appropriate to look at when modelling family influences on societal outcomes.[12] From the models' accuracy point of view, whether what is on the right side of the regression equation is an artificial construction, or empirically grounded information obtained by induction, may be of utmost importance.

Thriving on the 'cultural ideal' concept in the family classification had three further consequences. First, by imposing collective identity as regards familial behaviour on entire populations, the 'cultural ideal' concept is inevitably at odds with usually variable ways in which people of the same bounded territory could organize their familial life. In Todd's case the problem is exacerbated by the very nature of his major constituent variables which were set up into dichotomous categories (Todd, 1985, p. 29–32), thus striving to identify whether a country has an extended or a nuclear household structure, or whether brothers inherited equally or not (similarly Greif, 2006; Dilli, 2017, pp. 145–146; also De Moor & Van Zanden, 2010). Meanwhile, most family historians would find such binary distinctions highly superficial (e.g. Berkner, 1975; Wall, 1991). For example, in the eighteenth-century Ukraine (Szołtysek, 2015, p. 618), 55% of the population lived in streamlined (nuclear or solitary) domestic groups, whereas the remaining

45% were in units with various forms of family extension, making it a dubious exercise to suggest any clear-cut categorization of the prevailing household arrangement. The problem is definitely of wider relevance, because significant regional variations in historical household structures were reported also for demographically more uniform regions, such as the Netherlands, or the German territories (Van Der Woude, 1972, p. 306 ff.; Kok & Mandemakers, 2012; Szołtysek, Gruber, Klüsener, & Goldstein, 2014). Russia had been shown to reveal important meso-level diversity also (Dennison, 2003; Mitterauer & Kagan, 1982; Polla, 2006). With these concerns in mind, it remains doubtful whether the 'one size fits all' family arrangement could be attributed to any of these societies without harnessing non-realistic models of family organization. On the same grounds, Greif's (2006) account of the 'Western European social organization' based on the nuclear family can only be accepted at the highest level of generalization.

Second, comparisons of family systems based on whether they (inadvertantly) follow the propensity towards nuclear or complex coresidence (Todd, Le Bris, Duranton, Dilli; also Greif) are problematic also because household-level measurements are highly sensitive to demographic conditions and, therefore, may be inappropriate for a comparative analysis of populations with substantially differing demographic behaviours (e.g. King & Preston, 1990; Ruggles, 2012). The finding that nuclear households predominated in a given region could be indicative of a preference of the inhabitants for this type of arrangement over other types of arrangements; but it might also suggest the presence of unfavourable demographic conditions (i.e. low fertility, high mortality, late marriage), which would have prohibited the formation of extended households by setting limits on the type and number of kin available for co-residence (Ruggles, 1987).[13]

Third, due to reliance on Todd's pre-defined scheme, previous studies could consider the multidimensionality of historical family systems only selectively. Of the many elements of family organization that might be profitably linked to economic performance and value orientations, only a few have been analysed, with most research focusing on household structure, some aspects of marriage, and inheritance. At the same time, several other elements of familial behaviour – not captured in Todd's typology, such as living as non-kin or the prevalence of life-cycle service, marital age, headship and seniority patterns, as well as female position in domestic groups, which have long been used by historical demographers as indicators of different family systems (e.g. Hajnal, 1982; Wall, 1995), were not possible to examine.

Last, but not least, as a child of its day, Todd's scheme conflated family patterns of societies that once composed the Soviet Union – Belarus, Latvia, Lithuania, and Ukraine, with the all 'Russian-communitarian' family type, and more recent research based on his scheme has followed suit.[14] Meanwhile, historical evidence suggests that such views cannot be fully sustained. Sklar (1974), for example, ascertained that, around 1900, the Russian provinces of Estland, Lifland, Courland, and Kovno (which later became Estonia, Latvia, and Lithuania) stood clearly apart from the rest of the eastern European region, and from the rest of Imperial Russia in particular, at least with regards to age patterns of marriage and life-long celibacy. Attempts to level historical family patterns in Belarus with those of Russia have been shown to be equally inadequate (Szołtysek, 2015).

## 4. Microdata revolution and new approach to historical family systems

The information revolution which has been coming to historical population studies in the last years (Ruggles, 2012; also Billari & Zagheni, 2017) put the precedent data collection practices and the ways new data could be mobilized for historical demographic research on an entirely new footing. Through the help of a world-wide network of researchers, coordinated infrastructure support, and internet access, the massive quantities of previously unknown census and census-like microdata from many areas of Europe have been identified, sampled, and digitized (Ruggles, Roberts, Sarkar, & Sobek, 2011; Szołtysek & Gruber, 2016). Such data, because of their broad availability, provide sufficient information to effectively measure the main structural manifestations of family systems, both at the household and at the individual level, across multiple spatial settings. With rigorous data harmonization schemes fostering the combination of data from different sources, researchers are becoming increasingly empowered to analyse multiple censuses as a single dataset, to pursue comparative analysis over time and space and at different geographical scales, and to develop measures customized to particular research problems without a need to rely on pre-defined schemes (Ruggles, 2012, p. 341).

Our own contribution builds on two such exemplary datasets recently made available: the combined North Atlantic Population Project (NAPP) and Mosaic databases of historical census microdata (Ruggles et al., 2011; Szołtysek & Gruber, 2016; Szołtysek, Kluesener, Poniat, & Gruber, 2017b). These data are in the form of machine-readable, harmonized samples derived from various kinds of historical census and census-like materials, including full-count national censuses, as well as regional fragments of censuses, church lists of parishioners, tax lists, local estate inventories, all of which are very similar in terms of structure, organization, and the types of information they provide.[15] Anchored at the micro-level, these data facilitate the unravelling of large-scale demographic patterns through a bottom-up aggregation of familial and demographic indicators across multiple locations and at different scales.

Altogether the database we use outweighs in scope and contents all precedent infrastructure efforts in family history. Mosaic currently includes 142 samples of historical census and census-like microdata. It stretches over a large area from Catalonia to the Urals, between 1700 and 1918, and includes individual records for 1.1 million (1,085,136) persons living in 208,939 family households. NAPP expands the collection towards Great Britain and Scandinavia, bringing in data for an additional 151 historical regions from five national censuses, with more than 14 million observations.[16] Whereas NAPP components stand either for full-count census data or representative samples taken from them, Mosaic samples are of a varying level of representativeness (see Szołtysek & Gruber, 2016). Of the 293 regional datasets, a slight majority (56%) represents populations after 1850, while 44% cover populations before 1850, and 21% populations before 1800. The collection includes information on both rural and urban sites, although rural societies predominate (see Figure 1; also Supplementary Appendix 2).[17]

Using a range of harmonized variables from Mosaic and the NAPP, a composite measure of historical family organization known as the Patriarchy Index was computed for 293 regional populations, reflecting varying degrees of sex- and age-related social inequality across different family settings. The index comprises 10 variables grouped in
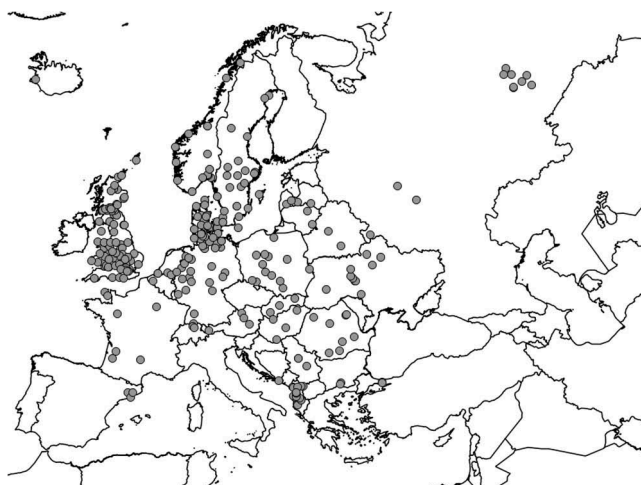
**Figure 1.** The distribution of regions covered with Mosaic and NAPP datafiles.
*Source*: Mosaic and NAPP. *Note*: One point represents a regional Mosaic or NAPP datafile.

four 'domains' – the domination of men over women, the domination of the older generation over the younger generation, the extent of patrilocality, and the preference for sons. Table 2 provides the complete list of the 10 components, showing how they are defined and measured, and indicating the expected direction of their relationship with patriarchy levels (±) (more in Gruber & Szołtysek, 2016; Szołtysek et al., 2017b). Most of the component variables directly capture various forms of gender and generational biases at the household/family level, other variables proxy behavioural patterns that could not be observed directly in our data. For example, the variable 'Proportion of elderly people living with married daughters', besides capturing the social prevalence of patrilocality, partially accounts for female empowerment in property devolution (Goody, 1976). By the same token, the proportion of young females living as non-kin (i.e. mainly as domestic servants) can be interpreted as a distant relative to the female labour force participation measures under the pre-industrial conditions. In the absence of comparative qualitative information, the PI can be used to account for the strength of familism and is a good measure of strong/weak family ties in historical populations (Szołtysek & Poniat, 2018).

These components were moulded into a composite measure constructed on the basis of information contained in Mosaic and NAPP data and at the level of resolution of regions, as presented in Figure 1. In the next step, the regional estimates of patriarchy were averaged for contemporary country borders and sat at the average time when their relevant information was taken from, making allowance for multiple boundary changes and population flows in the course of the 20th century. This aggregation strategy was necessary if one wanted to relate the patriarchy scores to our choice of developmental measures, the majority of which are only available at the country level. Such aggregation was also essential if comparisons with the FFI, which as yet has no estimates at the lower spatial scale, were to be pursued.

For the NAPP countries, we took an average PI value weighted by population size of their constituent regional groups.[18] The same strategy was applied to a number of

**Table 2.** Components of the Patriarchy Index.

| Domain | Component | Abbreviation | Definition/measurement | Relationship with patriarchy | Specification |
|---|---|---|---|---|---|
| Male domination | Proportion of female household heads | Female heads | The proportion of all female household heads (20+ years) among all adult heads of family households | Negative | Age-standardized |
| | Proportion of young brides | Young brides | The proportion of ever-married women in the age group 15-19 years | Positive | |
| | Proportion of wives who are older than their husbands | Older wives | The proportion of all wives who are older than their husbands among all couples for whom the ages of both spouses are known | Negative | Age-standardized |
| | Proportion of young women living as nonkin | Female nonkin | The proportion of women aged 20-34 years who live as nonkin, usually as lodgers or servants | Negative | Age-standardized |
| Generational domination | Proportion of elderly men coresiding with a younger household head | Younger household head | The proportion of men aged 65+ years living in a household headed by a male household head of a younger generation | Negative | Only family households;the elderly men must be relatives of the household head |
| | Proportion of neolocal residence among young men | Neolocal | The proportion of male household heads living without any relatives except spouses/children among ever-married men aged 20-29 years | Negative | Only family households; age-standardized |
| | Proportion of elderly people living with lateral relatives | Lateral | The proportion of people aged 65+ years living with at least one lateral relative in the household | Positive | Only family households |
| Patrilocality | Proportion of elderly people living with married daughters | Married daughter | The proportion of people aged 65+ years living with at least one married daughter in the same household among those elderly people who live with at least one married child in the same household | Negative | Only family households |
| Son preference | Proportion of boys among the last child | Boy as last child | The proportion of boys among the last children (if the last child is one of a set of siblings of both sexes, he or she will be excluded from the analysis). | Positive | Only children (aged 10-14 years) of household heads; family households |
| | Sex ratio of youngest age group | Sex ratio | The sex ratio (boys to 100 girls) in the youngest age group (0-4 years old) | Positive | Only family households |

countries represented in Mosaic with several censuses of the same structure (i.e. either rural or urban). Where the contrary was the case, the average PI value from various censuses was weighted by an index of urbanization characteristic of a given area at a respective time-period using data available from Malanima (2010). In this way, the weight of the over-represented urban populations could be mitigated. In cases where our country values were derived from censuses of a different chronology, the above procedure was applied to each dataset separately, then followed by taking a grand mean (here, weights related to population size were no longer used). The only special case in this regard was that of Switzerland – for two periods the available populations were either rural or urban. Here, we still applied the urbanization weights (averaged for the periods in question) which enabled us to reduce the impact of a very low PI characterizing the 19th century Zurich. Finally, when it comes to countries for which there was only one census population available in Mosaic, the PI value derived from that population was taken to represent the whole country.

In the end, by following those routines we were able to compute the historical PI values for 26 contemporary European countries. These values range from 12–29 index points, with Denmark scoring lowest on the patriarchy scale, and Albania situated at the top end of it (see Figure 2 and Table 3).

The dataset advanced here represents country-level generalizations derived from empirically assessed variation at the regional level, and can be considered as accounting for cross-country variability in historical family patterns within Europe as studied here. The social prevalence of the PI may be taken to have variably influenced not only the cultural orientation of a country's ancestral population, but also largely the types of action which dominate thereby, including those prone to more rigid gender and age hierarchies within the domestic domain, and the enactment of loyalty to family, kin or lineage, filial piety, and reverence for ancestors and obedience.

Given the unequal coverage of contemporary countries with the underlying Mosaic data, the outcome of our aggregation strategy is subject to some inevitable limitations.
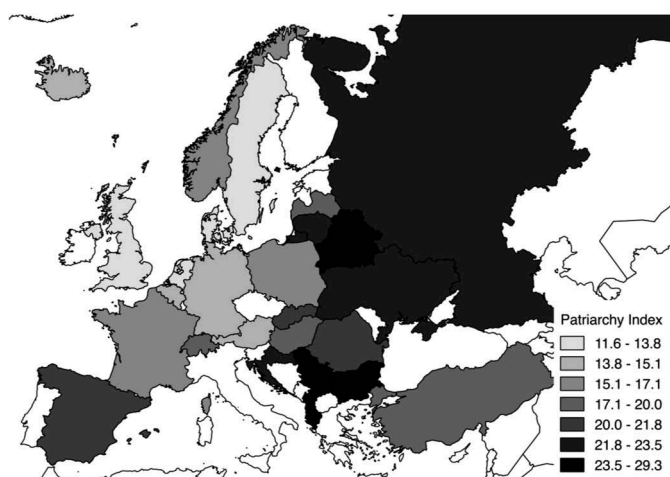


**Figure 2.** Cross-country variation in historical patriarchy (combined Mosaic/NAPP data).

*Notes*: For sources of the Mosaic and NAPP data, see Supplementary Appendix 3. White colour indicates no country data.

**Table 3.** Basic characteristics of Mosaic/NAPP country samples.

| Country | PI | IQR | No. of regions | No. of settlements (parishes/ villages)* | Pop. | % rural | Time (average) | Time (range) |
|---|---|---|---|---|---|---|---|---|
| Albania | 29.3 | 4.0 | 14 | 291 | 140,611 | 58 | 1918 | — |
| Austria | 14.9 | 5.2 | 4 | 53 | 20,036 | 74 | 1910 | — |
| Belarus | 25.1 | — | 2 | 90 (p)/340 | 44,508 | 100 | 1793 | 1768–1804 |
| Belgium | 14 | — | 1 | 5 (p) | 13,666 | 100 | 1814 | — |
| Bulgaria | 24.7 | — | 2 | 8 (p) | 8,373 | 78 | 1908 | 1877–1947 |
| Croatia | 22 | — | 1 | 24 | 1,880 | 100 | 1674 | — |
| Denmark | 12.2 | 1.0 | 19 | n/a | 838,623 | 94 | 1787 | — |
| France | 16.4 | 3.0 | 5 | 33 | 27,745 | 79 | 1845 | 1831–1901 |
| Germany | 14.2 | 3.2 | 44 | 690 | 384,049 | 62 | 1824 | 1700–1900 |
| Hungary | 19 | 2.2 | 4 | 20 (p) | 13,724 | 100 | 1869 | — |
| Iceland | 14 | — | 1 | n/a | 51,003 | 100 | 1703 | — |
| Lithuania | 22.5 | — | 2 | 480 | 19,917 | 100 | 1847 | — |
| Netherlands | 13.6 | 1.0 | 5 | 33 | 40,037 | 53 | 1811 | 1810–1811 |
| Norway | 16.3 | 1.0 | 21 | n/a | 878,073 | 95 | 1801 | — |
| Poland | 16.7 | 3.0 | 10 | 88 (p)/440 | 83,276 | 65 | 1791 | 1666–1809 |
| Romania | 20.1 | 1.25 | 8 | 71 | 14,514 | 100 | 1844 | 1781–1879 |
| Russia | 22.6 | 2.7 | 11 | 85 | 46,296 | 92 | 1768 | 1710–1897 |
| Slovakia | 20.5 | — | 3 | 21 | 8,410 | 100 | 1869 | — |
| Spain | 20.9 | — | 3 | 13 (p) | 23,997 | 29 | 1889 | 1880–1890 |
| Sweden | 12.9 | 2.2 | 24 | n/a | 4,624,825 | 92 | 1880 | — |
| Ukraine | 22.2 | 2.0 | 11 | 231 | 90,022 | 81 | 1815 | 1765–1897 |
| UK | 11.6 | 1.0 | 83 | n/a | 7,859,626 | 57 | 1881 | — |
| Serbia | 24.7 | — | 3 | 18 | 19,180 | 86 | 1870 | 1863–1884 |
| Turkey | 20 | — | 2 | 1 | 8,354 | 0 | 1896 | 1885–1907 |
| Switzerland | 17.3 | — | 3 | 18 (p) | 16,140 | 68 | 1787 | 1671–1870 |
| Latvia | 19.1 | 2.2 | 4 | 67 (p) | 35,807 | 100 | 1797 | — |

Source: Mosaic and NAPP.
* Numbers indicated with (p) stand for parishes or estates; otherwise refer to settlements/villages.

Note, however, that, before the advent of public use large databases, it was customary for scholars to examine whatever material they were able to collect as standing for entire populations, countries, or even continents (see Laslett, 1977; Wall, 2001; also United Nations, 2005, p. 7), despite oftentimes uncertain data representativeness or small sample sizes. Notably, similar uncertainties shatter only a small group of countries in our collection, including Croatia, Bulgaria, Turkey, Belgium, and Spain, each represented by a single or a highly clustered censal population (see Figure 1 and Table 3). The rest of our country averages yield fairly reasonable representations of those countries' historical familial diversity at a certain moment in time (Szołtysek & Gruber, 2016). Also, as columns 3 and 4 of Table 3 make clear, most of our country averages are composed of large or very large population aggregates derived from censuses covering multiple locations and broad geographical areas. For example, the Polish average (to mention only the major 'suspects' from Todd's own work) was derived from 10 regional populations with altogether 80,000 people from 88 parishes and 440 villages or towns; the Albanian one was based on data for 140,000 people distributed over 14 regional clusters comprising 291 settlement points; while for Romania it encompassed seven dozens villages across eight regions, altogether with more than 35,000 people. The amount of data we have amassed for Russia is inevitably less impressive, although it still pools together 11 ecologically and political-economically diverse areas with 85 settlements and 46,296 persons, and covers nearly 200 years (1710–1897).

Importantly, even the majority of potentially the most worrying country-averages has a non-negligible population component, far from 'hit-or-miss' approaches of the older literature. The Belgian country-mean, although indeed regionally clustered, consists of nearly 14,000 individuals from five villages. The Bulgarian data cover 8,000 inhabitants of eights villages, and the Spanish sample contains over 20,000 individuals. Furthermore, all post-Soviet republics neglected in Todd's classification (except for Estonia) also received a substantial coverage in our database, ranging from 67 parishes with 35,000 inhabitants in Latvia; through 90 parishes with 340 villages in Belarus and 231 locations throughout the Ukraine; to 480 settlements in historic Lithuania.

By combining a range of 10 variables related to familial behaviour rather than just focusing on marriage patterns or on the prevalence of nuclear families, the underlying structure of the PI moves us closer to a multi-stranded account of family organization in the past (cf. Mason, 2001, pp. 160–161). While Todd's scheme takes four (five in Carmichael's case) aspects and adds them up, implicitly assuming that each is equally important, the PI has the virtue of using more elements (10) with varying weights, thus reducing the chance that any strange component drives the index's variation. By choosing to use individual-level and age-specific measures instead of household-level variables we also ensure that our indicator of family structure is less sensitive to the latent variation in demographic conditions (Ruggles, 2012). Unlike Todd's scheme, the PI allows for making distinctions between various family types once account has been taken of gender relations through an explicit consideration of male domination among its diagnostic criteria. By capturing the inner architecture of generational and gender relations at the domestic level, it presents itself superior for the identification of the channels that – through their bearing on individual agency – may have affected economic behaviour and value formations. Moreover, the continuous rating scale implemented in the PI provides a more sensitive metric for the assessment of the intensity of familial behaviour in a given population than fixed categories or binary measures. Finally, to the extent that Todd's classification of family systems leaves certain doubts about its source of information and the historicity of the patterns posited, we make the composition of our dataset fully transparent by providing explicit information about the sample size and the number of its constituent populations, the period of observation, and the share of urban–rural population in the data which came to constitute each country sample (Table 3).

## 5. Comparing the predictive validity: the PI versus the FFI

Given these contrasting data and measurement practices, we decided to evaluate comparatively the predictive validity of Carmichael's 'Female Friendliness Index' and the PI for selected developmental traits in Europe. The FFI (see Table 1) assesses how gender-equal each society was, based on various components of its family system, such as inheritance patterns, domestic organization, the prevalence of cousin marriage, post-marital residence, and the extent of monogamy (Carmichael, 2014, pp. 187–189). While some of these measures correspond to the components of the PI, they were derived in a different manner by utilizing the information from Todd, and extrapolating it to entire countries.[19]
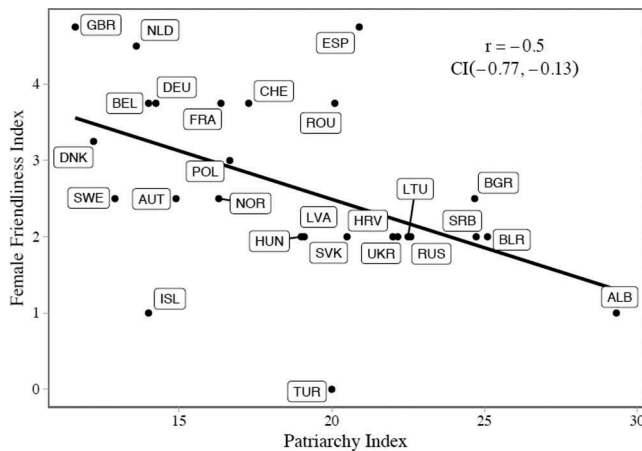
**Figure 3.** Unconditional cross-country correlations between historical patriarchy (PI) and the Female Friendliness Index.

*Notes*: The 95% bootstrapped confidence intervals (based on 1,000 replications) in parentheses. *Source*: for PI – Mosaic/ NAPP database; for FFI – data courtesy of S. Carmichael.

To pursue such a comparison, we computed a series of unconditional correlations looking at how the focal variables associate with each other and with selected contemporary indicators of gender equality, value orientations, and economic output. Given a small sample size of our study (, we decided to use bootstrapping and 95% confidence intervals (CI). Accordingly, each of the subsequent correlations is based on 1,000 simulations, and their confidence intervals were obtained with the use of the bias-corrected and accelerated (BCa) method (Efron, 1987).

Figure 3 explores the association between the two measures of historical family patterns. The correlation shows a moderate negative relationship between the FFI and the PI, implying that, along with the increase in historical patriarchy levels, the probability that a country would be characterized by more 'female friendly' arrangements decreases. In view of the very different properties of the two measures, this finding definitely merits attention. However, the 95% confidence intervals also indicate a fair amount of uncertainty in the actual magnitude of the relationship between the two variables which may contain both large as well as very small effects. There are also striking discrepancies in how some countries are positioned according to both indexes. For example, according to Carmichael's data, Spain has been historically as 'female friendly' as Great Britain, whereas both countries differ substantially in their historical patriarchy levels. On the other hand, Iceland and Albania, i.e. countries almost at the extremes of patriarchal scales, are considered equal according to the FFI values.[20] We think this is exactly where Todd's misclassification looms large. First, Spain has been a paradigmatic *strong family* society (Reher, 1998), very much unlike England, which suggests that our own estimates seem more realistic in this regard, even if allowance is taken for the Catalan PI scores to be somewhat above the actual Spanish average (see Reher, 1997, pp. 23–24, 32). Second, early modern Iceland has often been portrayed as representing an 'extreme' variant of the EMP in quite some respects (Dennison & Ogilvie, 2014) – which explains its low score on the patriarchy

scale, while the Albanian example was regularly adduced to epitomize the rigid 'Balkan patriarchy' (Kaser, 2008), also well captured by the PI. In addition, the correlations raise suspicions due to the positioning of the post-Soviet republics on the same 'female friendliness' level as Russia, thus obscuring important differences in their respective patriarchy levels in the past (especially for Latvia). On the other hand, the outlying position of Turkey points out likely deficiencies of this country's patriarchal indexing with the current Mosaic data.

In the next step we check the extent to which the two historical family measures predict cross-country differences in contemporary family values and practices. As response variables we first considered Alesina's subjective measure of the strength of family ties based on the 1981–2007 pooled dataset of the World Values Survey (Alesina & Giuliano, 2010), and a similar, although not identical, index of family ties proposed by Thornhill and Fincher (2014, p. 131).[21] In the case of both variables, larger values indicate stronger family ties. Given that the FFI is supposed to capture the familial 'cultural ideal' of strong durability, it might be expected that it should align well with contemporary family values. However, as shown by the upper panels (A-B) of Figure 4, the association between historical 'female-friendliness' and current family values is very imperfect. The widely scattered distribution of countries around the almost horizontal regression line indicates that there is very little systematic relationship between Carmichael's classification of societies and the contemporary cross-country variation in family values. The FFI's relationship with Fincher/Thornhill's measure, while showing that family variables are scattered more uniformly on the area of the plot, still does not reach significance level.

The bottom panels of Figure 4 show that the relationship is far from satisfactory also for the PI. Although the slope of the regression line is clearly upward in both diagrams, the 95% confidence intervals are still too wide to suggest a certain estimate. Nevertheless, their relative narrowing, compared to panels A and B above, suggest that the PI is somewhat better suited for the purpose of predicting cross-country differences in present-day family values than its counterpart.

Figure 5 focuses on the correspondence between our two measures and contemporary family behaviours, which we account for using Welzel's (2013) measure of 'contemporary patriarchy' (based on a series of responses from the World Values Survey)[22] and the percentage of 30–39 year olds living with parents from the 2008 *European Values Study* data. Notably, at stake here are aspects of familial behaviour directly corresponding to some components of both historical indexes. For example, the prevalence of earlier marriage – as captured in Welzel's measure – by encouraging fertility maximization and the suppression of female activities outside the home, might be conducive to more patriarchal conjugal relations (Therborn, 2004; Gruber & Szołtysek, 2016) and to a less 'female-friendly' environment in general. Accordingly, the fact that the individual lives with his or her parents can be indicative of stronger family ties, more stringent authority patterns based on age, as well as a greater departure from neolocality and nuclear family structure (Reher, 1998; earlier Banfield, 1958; also Todd, 1985).

The upper panels of Figure 5 show that the relationship between the FFI and contemporary family practices is noticeable, but not strongly predictive. In both diagrams (panels A and B) the data distribution is quite noisy, and the scatterplot gives no clearly discernible linear relationship between the variables yielding the values of Person's *r* rather weak and insignificant for confidence interval of 95%. This stems partly
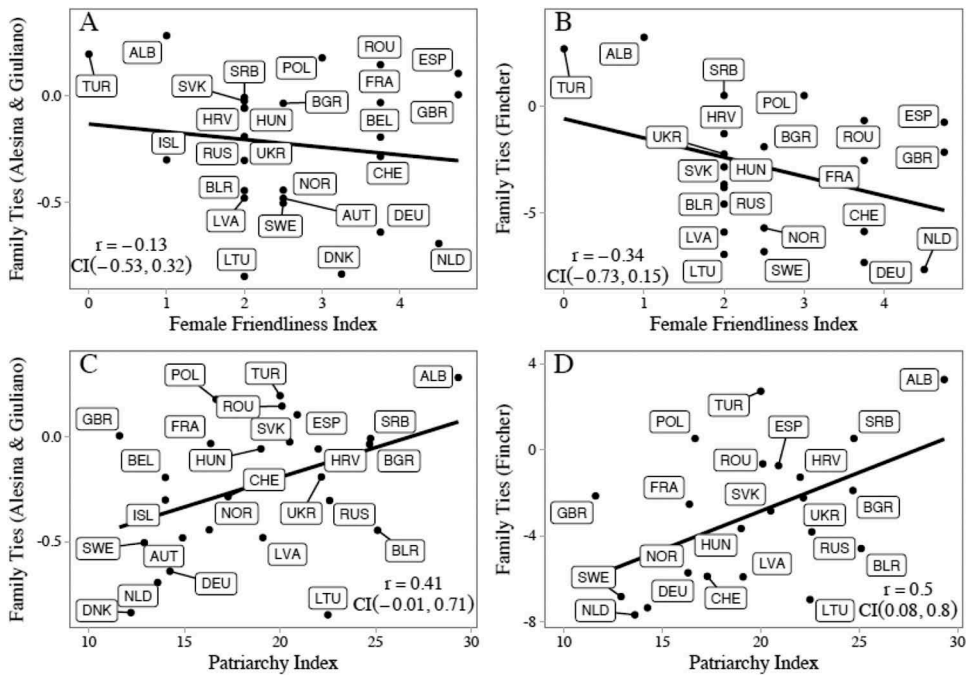
**Figure 4.** Unconditional cross-country correlations between measures of historical family systems and contemporary family values.

*Notes*: The bootstrap 95% confidence intervals (based on 1,000 replications) in parentheses. 'Family Ties (Alesina & Giuliano)': Alesina and Giuliano's measure of the strength of family ties based on World Values Survey (Alesina & Giuliano, 2010; data: courtesy of Alberto Alesina); 'Family Ties (Fincher)': Thornhill and Fincher's measure of the strength of family ties based on World Values Survey (Thornhill & Fincher, 2014; data: courtesy of C. Fincher). For the FFI and the PI: sources as in Figure 3.

from assigning medium 'female friendliness' scores to countries with extremely low levels of contemporary patriarchy and co-residence, such as Iceland, Sweden, or Norway. It could, of course, be argued that past levels of 'female friendliness' were subject to change and at long last they may not have much in common with current practices of modernized societies, but such reasoning would undermine the usefulness of the FFI in tracing historical roots of contemporary phenomena.

The respective correlations are much stronger and more reliable when contemporary family practices are predicted with the PI (Figures 5(c and d)). For both Welzel's *Contemporary Patriarchy* and the EVS data, the relationship is fairly linear and has no particular outliers. In both cases, countries with higher patriarchy values in the past are showing higher contemporary patriarchy and higher frequencies of intergenerational co-residence. The Pearson *r* of 0.80 or above, and plausible values of the coefficient as expressed by a 95% confidence interval ranging from 0.61–0.89 for the former variable, and from 0.74–0.94 for the latter one, imply very substantial effects.

Figures 6(a–c) show bivariate correlations between historical measures and the Gender Inequality Index (GII). Again, these correlations are worth scrutiny, given the significance of both 'female friendliness' and historical patriarchy for the emergence of gender asymmetries and their persistence. The data indicate that, although both historical indexes are tied to contemporary gender patterns in an expected way – i.e. more
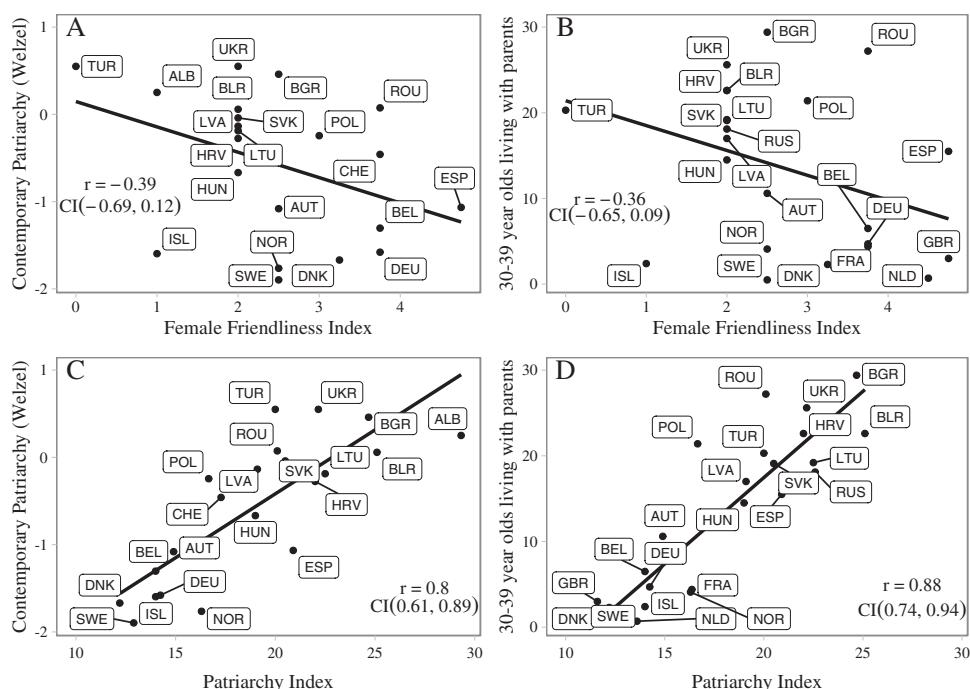
**Figure 5.** The unconditional cross-country correlations between measures of historical family systems and contemporary family practices.

*Notes*: The bootstrap 95% confidence intervals (based on 1,000 replications) in parentheses. Welzel's measure of contemporary patriarchy are time-pooled cross-section country aggregates from WVS Waves 6; data: courtesy of C. Welzel. For the EVS data, see: EVS (2016). European Values Study 2008: Integrated Dataset (ZA4800 Scientific Use File; v4.0.0, doi:10.4232/1.12458). GESIS Data Archive, Cologne. For the FFI and the PI: sources as in Figure 3.

'female friendliness' in the past translates into lower gender inequalities today, while the reverse applies to historical patriarchy, the PI is a much better predictor than the FFI. The correlation involving the latter is only marginally significant and is affected, again, by a number of outlying cases (the Nordic countries, Romania, and Turkey). On the other hand, the match between GII and the PI is strongly positive and statistically significant ($r = 0.64$) and the 95% confidence intervals are comparably much more narrowed.

The discrepancy between the two historical indicators becomes greater when looking at how they correlate with the Emancipatory Value Index (EVI), a recent reformulation of Inglehart's seminal measure of societal individualism (Welzel, 2013) (Figures 6(b–d). Against the grid of their historical family characteristics, the countries' standing with regards to the strength of contemporary individualistic values is generally plausible, with an uphill pattern for the FFI, and a downhill one for the PI. Still, however, the bootstrapped confidence interval for the FFI (ranging from 0.16–0.75) suggests that inferences which might be drawn from this correlation are fraught with uncertainties. For the FFI, a number of countries fit the general pattern very poorly (Nordic countries and the post-Soviet republics, as well as Romania), and only very few countries sit astride or nearby the diagonal.

On the other hand, Figure 6(d) indicates that a country's patriarchal profile is strongly and inversely related to the strength of individualistic values today. The relationship is fairly linear and, except for Sweden and Norway, has no other outliers. With the 95%
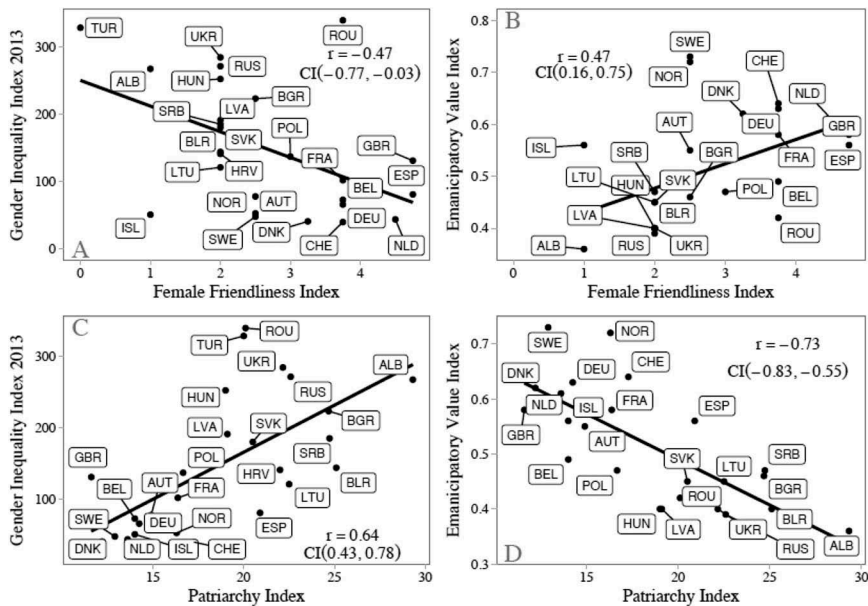
**Figure 6.** Unconditional cross-country correlations between measures of historical family systems and contemporary gender inequality and value orientations.

*Notes*: The bootstrap 95% confidence intervals (based on 1,000 replications) in parentheses. Gender Inequality Index measures gender inequalities in: reproductive health (maternal mortality ratio and the adolescent birth rates); empowerment (proportion of parliamentary seats occupied by females and the proportion of adult females and males aged 25+ years with at least some secondary education); and economic status (labour market participation of the female and the male populations aged 15+ years); for data, see http://hdr.undp.org/en/content/gender-inequality-index-gii (higher values indicate more gender inequality). Emancipatory Values Index is the 12-item index introduced by Welzel (2013, pp. 57–104) based on responses taken from the World Values Survey (WVS), measuring the belief in freedom of choice and equality of opportunities over four domains, each of which summarizes three items: (1) equity values: an orientation that prioritizes gender equality over patriarchy; (2) liberty values: an orientation that prioritizes reproductive freedoms over their restriction; (3) autonomy values: an orientation that prioritizes self-determination over obedience; (4) expression values: an orientation that prioritizes voice over order. Data: courtesy of C. Welzel. For the FFI and the PI: sources as in Figure 3.

confidence interval of Pearson *r* ranging from −0.55 to −0.83, the estimate is much more satisfactory from an accuracy point of view compared to the FFI.

The discrepancy between our family indicators manifests even stronger in the correlations with contemporary per capita GDP (logged) (Figures 7 (a-b)). Both correlations are in line with theoretical expectations and previous research (Bertrand & Schoar, 2006; Dilli, 2017). They show upward or downward sloping depending on the FFI or the PI, respectively, but the uncertainty associated with estimates derived from the correlation with Carmichael's index again outweighs that pertaining to when historical patriarchy is used. Although the bootstrap 95% confidence intervals for the correlation with the FFI do not include zero, they come worryingly close. On the contrary, the observed negative correlation for the PI (Figure 7(b)) appears impressively general and downward sloping and not driven by any strong outliers, suggesting that, for countries with high patriarchy traits in the past, there is a significant increase in the probability of being characterized by lower economic output in the present. Even the lower boundaries of 95% confidence intervals (above −0.70 point estimate) would represent a genuinely large effect.[23]
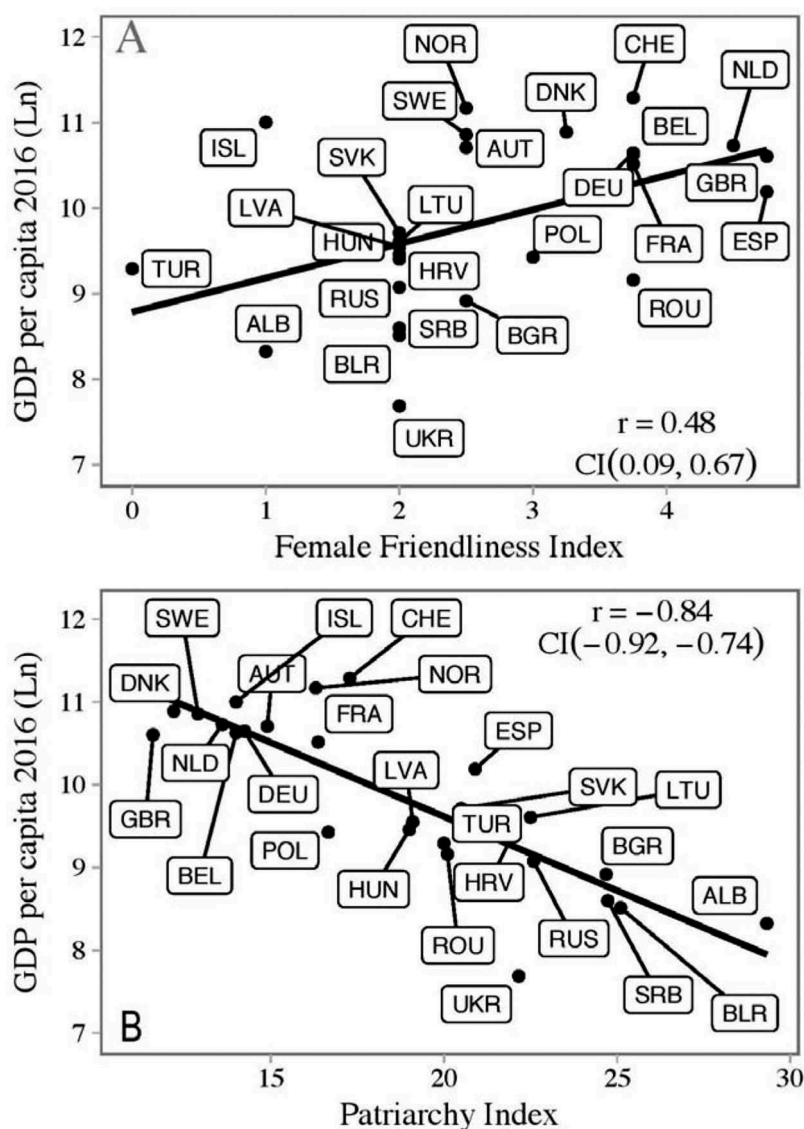
**Figure 7.** Unconditional cross-country correlations between measures of historical family systems and contemporary economic output.

*Notes*: GDP is per capita gross domestic product of 2016 (transformed by taking the natural logarithm; source: the World Bank). For the FFI and the PI: sources as in Figure 3.

## 6. 'Female Friendliness Index' at different scales

From the evidence presented above it might be deduced that the FFI is actually not the most suitable predictor of contemporary European developmental traits. This may be related either to the overall invalidity of the index, but may also be due to focusing our observation on a small number of potentially less-variable countries, which makes significant effects more difficult to identify (Type II error or false negative). However,

**Table 4.** Unconditional cross-country correlations between the Female Friendliness Index (FFI) and selected contemporary measures of gender inequality, value orientations, and economic growth, by different geographical scales.

| Sample | Estimate | P-value | df | Conf.low | Conf.high | R-squared |
|---|---|---|---|---|---|---|
| | | FFI ~ GII 2015 | | | | |
| World | −0.487 | $2.01e^{-10}$ | 150 | −0.600 | −0.355 | 0.237 |
| Europe | −0.475 | $1.47e^{-3}$ | 40 | −0.681 | −0.200 | 0.225 |
| OECD | −0.343 | $4.71e^{-2}$ | 32 | −0.610 | −0.00533 | 0.117 |
| | | FFI ~ GGG | | | | |
| World | 0.452 | 0.0000000182 | 139 | 0.310 | 0.574 | 0.204 |
| Europe | 0.153 | 0.333 | 40 | −0.158 | 0.437 | 0.023 |
| OECD | 0.0718 | 0.687 | 32 | −0.273 | 0.400 | 0.005 |
| | | FFI ~ SIGI Family 2014 | | | | |
| World | −0.551 | $9.62e^{-14}$ | 154 | −0.651 | −0.431 | 0.303 |
| Europe | −0.0641 | $6.94e^{-1}$ | 38 | −0.368 | 0.252 | 0.004 |
| OECD | −0.0459 | $8.03e^{-1}$ | 30 | −0.388 | 0.308 | 0.002 |
| | | FFI ~ EVI | | | | |
| World | 0.619 | $3.18e^{-12}$ | 101 | 0.483 | 0.726 | 0.383 |
| Europe | 0.468 | $1.57e^{-3}$ | 41 | 0.195 | 0.673 | 0.219 |
| OECD | 0.351 | $4.20e^{-2}$ | 32 | 0.0142 | 0.616 | 0.123 |
| | | FFI ~ GDP PC 2016 (ln) | | | | |
| World | 0.386 | 0.000000388 | 160 | 0.247 | 0.510 | 0.149 |
| Europe | 0.377 | 0.0139 | 40 | 0.0822 | 0.611 | 0.142 |
| OECD | 0.215 | 0.229 | 31 | −0.138 | 0.520 | 0.046 |
| | | FFI ~ GDP PC 1960 (ln) | | | | |
| World | 0.509 | 0.000000399 | 86 | 0.336 | 0.650 | 0.259 |
| Europe | 0.0486 | 0.843 | 17 | −0.415 | 0.492 | 0.002 |
| OECD | 0.227 | 0.255 | 25 | −0.167 | 0.559 | 0.051 |

*Note*: Respective samples include: World – all countries with calculated FFI. Europe – European countries with FFI values, OECD – current OECD members.

GGG is Global Gender Gap Index; it measures a country's *ability* to close the gender gap in health, education, economy, and politics (World Economic Forum, 2016; http://reports.weforum.org/global-gender-gap-report-2016/rankings/); SIGI Family is the component of the Social Institutions and Gender Index measuring a country's 'Discriminatory Family code' with regards to marriage, parental authority, and inheritance rights in 2014 (OECD Development Centre, Social Institutions and Gender Index 2014. Synthesis Report, 61–64; https://www.genderindex.org/countries/?region= europe-and-central-asia); for GII and EVI, see Figure 6. Source for FFI, as in Figure 3.

considering that historical patriarchy reconstructions may be difficult to derive beyond Eurasia, scholars may continue to be bound to using the FFI to assess global family patterns. If so, it might be important to know to what extent that measure's overall predictive power is sensitive to the spatial scale being chosen. Table 4 presents the results of such evaluation (note that, for diagnostic purposes, the list of our response variables has been expanded).

Overall, we observe that at the global scale the FFI captures pretty well the association between historical family patterns and contemporary indicators. When correlations are based on the largest number of countries from different continents (presumably strongly adverse in their comparative development levels), the FFI yields relatively large effects and may explain up to 40% of the variance (see FFI vs EVI).[24] However, once we move to data samples composed of presumably less variable countries, either those in Europe, or those belonging to the OECD, the predictive power of Carmichael's index decreases substantially. For example, in the worldwide sample the obtained *R*-squared for the relationship between FFI and EVI is 0.38. However, for European data the amount of variance explained is cut nearly by half, and by three times when the comparison is sat at the OECD level. Similar or even more

spectacular drops apply to other indicators, often in pair with the reduction of statistical significance, partly due to a decreasing number of observations once changing the scales. However, given that the coefficients are standardized, the sole differences in the variables' range (assuming that they still have relatively normal distribution) should not result in the reduction of correlation between them. That the predictive power of the FFI decreases in the comparisons between less variable countries seems inevitable given that Todd's dichotomous classification yields similar overall outcomes for relatively different societies.

## 7. Conclusions

Whereas the potential importance of family culture for contemporary gender equality, economic growth and value orientations has been convincingly unravelled, the literature still seems far from providing unequivocal evidence for the existence of such relationships when historical contingencies within Europe are at stake. In this paper we show that one reason for that could be that the adequacy of data and indicators for the purpose of assessing historical family formations does not stand up to scrutiny, and may even be misleading. This weakness is quite striking given the overall goal of research we have reviewed here to provide analyses with a high certainty, but it also exemplifies the inherent difficulties in mobilizing sufficient historical information long challenging the scholarly community.

Next to highlighting the problems with the precedent measures of historical family systems our goal was to suggest certain steps to improve them, feasible with data sets currently not too hard to compile. To this end, we drew on a recent outburst of historical census microdata suggesting newly-available statistics and a derived measure to explore the effects of historical family organization on developmental gradients. By evaluating this new indicator comparatively we showed that progress in the assessment of the relationship between family patterns in the past and contemporary outcomes within Europe may be contingent on the choice of historical measures. Before we pause with putting effort in understanding what place the family occupied in the 'horse race' between various deep causes of human development (Dennison & Ogilvie, 2014), it might be worth considering what is to be gained from taking into account a broader range of data and indicators than has been used thus far. Our contribution makes the first step in the direction of reaching this goal.

## Notes

1. For evidence suggesting that strong family ties are not that unambiguously antagonistic to development, progress, and civic virtues, see, for example Greenhalgh (1990), Macry (1997), and Whyte (1996).
2. In this paper the problem of the family-development nexus is framed primarily by our concerns over data quality and their handling for operationalizations of historical family systems. Accordingly, the correlations presented below are used as diagnostic criteria to assess whether the respective measures are able to capture the long-term historical persistence within Europe. More elaborate analysis of these relationships using a multivariate framework has been presented elsewhere (Szołtysek & Poniat, 2018).

3. Besides examples cited below, see also Bertocchi and Bozzano (2015, 2016), Galasso and Profeta (2012), and Mamadouh (1999).
4. Earlier versions of this paper were in circulation at least since 2013.
5. Given the latter's meagre coverage of Europe, the European part of Rijpma/Carmichael's dataset was based primarily on Todd. See more on the Atlas below.
6. Patrilineal descent, post-marital residence, extended household, monogamy versus polygamy, cousin marriage, inheritance, bride price, and the presence of clans.
7. We narrow our assessment of Todd's scheme to Europe, because his own work has started with Europe and because using a bigger lens to observe a smaller number of potentially less-variable countries may be beneficial to spotting issues which may escape attention at a truly global scale, where even microscopic differences can turn out to be statistically significant. Furthermore, our perspective is dictated by the scope of the historical datasets we employ.
8. Todd's account of European variation (Todd, 1985, 1987) relies on a massive body of secondary literature which – as he argued – provided no indication contrary to his classification, while at the same supporting his assertion of the long-term (sometimes even 500-year-long!) persistence.
9. These works relied on researches carried out in the post-Revolutionary period and dating farthest back to the turn of the nineteenth-century.
10. On the other hand, Todd's assertions are much more firmly grounded for countries such as France or Italy (see for example, Bertocchi & Bozzano, 2015).
11. In some few cases, Todd's anthropological evidence is punctuated with reconstructions based on strictly empirical work, like for example in his account of the Dutch family pattern which relied on the work of Van der Woude (1972).
12. Even within a particular society one normally observes tensions between norms derived from official religious teachings, civic legal system and traditional mores, all of which do not always comply with each other. Moreover, a historian might have his/her doubts from the very outset about how family beliefs and values could be ascertained as far as illiterate masses of rural people who dominated traditional Europe were concerned.
13. According to Ruggles, 'the percentage of complex households tells us virtually nothing about the family system' (2012, p. 431).
14. For example, Carmichael equated the 'female friendliness' scores for those countries with the one overarching 'Russian' category.
15. See www.censusmosaic.org; https://www.nappdata.org/napp/. All of the samples describe the characteristics of individuals in a given settlement or area grouped into households (co-resident domestic groups), and provide information on the relationships between co-resident individuals, as well as their sex, age, and marital status.
16. In collecting the NAPP data we gave preference to the oldest available censuses for north-western Europe. It was possible to obtain data for Iceland, Denmark, and Norway for the late 18th/early 19th centuries; while for Sweden (1880) and England and Wales (1881) we were forced to use NAPP data from the late 19th century (the data for Great Britain in 1851 were highly clustered, and were, therefore, not considered). Except in England, where we employed a 10% sample, we used 100% samples.
17. The regions in the NAPP data are administrative units that were used in the respective census and that were considered by NAPP. The Mosaic data are organized by separate locations, which in most cases also represent separate administrative units. As a rule of thumb, we ensured that each Mosaic region had at least 2,000 inhabitants, and that urban and rural settlements were separated.
18. In what follows we focus primarily on the Mosaic part of the dataset which is used for that paper. Since the NAPP regional data are derived from complete populations or 10% representative samples, they are of no issue in this regard.
19. In the analysis below we consider the FFI rather than the FCOWA, because the latter's additional components – especially bride price and the presence of clans, are largely irrelevant as far as European societies are concerned. Also, the FFI seemed more preferable

because its earlier applications were closer to our own measure in terms of the geographic scope. Finally, to the best of our knowledge, the FCOWA values are not available at the country level.

20. Noticeably, there appears to be no classification for Iceland in Todd's typology.
21. Alesina and Giuliano's variable was derived from responses to questions about the importance of the family, the love and respect that children are expected to have for their parents, and parental duties towards children. Thornhill and Fincher's measure was based on the same information as that of Alesina, but included also responses to questions about 'goals in life' and 'parental co-residence'.
22. *Contemporary Patriarchy* combines scores for the percentage of females who declared being married before the age 20, and for the percentage of married men (aged 30–34 years) who declared living with parents (Welzel, 2013).
23. Nearly identical patterns are observed when the Human Development Index is used for the correlation. Furthermore, to check the robustness of our results we have run simple quantile regression models with PI or FFI as dependent variables and the contemporary indicators as predictors. Since the quantile regression allows estimating percentiles (in this case median) instead of the mean, it is much less sensitive to outliers and influential observations. For the PI, the analysis of the bootstrapped 95% confidence intervals based on 1,000 simulations has confirmed all previous correlation results. For the FFI, the results are confirmed in all but two cases (once, in favour of the index; the other time – against it; see Table A1 in Appendix 1).
24. Here we rely on the values of $R$-squared because it allows for an easy comparison of the size of Pearson's correlation coefficients.

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# Appendix 1

**Table A1.** Results of the quantile regression with PI or FFI as dependent variables and the contemporary indicators as predictors.

| Dependent variable | Predictor | Est. | Low | High | Sign. | Results confirmed |
|---|---|---|---|---|---|---|
| PI | FFI | −2.76 | −4.72 | −0.229 | X | X |
| PI | Family Ties (Alesina) | 8.5229 | −2.339 | 15.835 | | X |
| PI | Family Ties (Fincher) | 1.2587 | 0.19 | 1.609 | X | X |
| PI | Contemporary Patriarchy | 4.0947 | 2.322 | 5.936 | X | X |
| PI | 30–39 living with parents | 0.4076 | 0.3438 | 0.5697 | X | X |
| PI | GII 2013 | 0.0364 | 0.0094 | 0.0705 | X | X |
| PI | EVI | −33.2 | −58.64 | −15.17 | X | X |
| PI | GDP 2016 (ln) | −4.6517 | −6.04 | −1.847 | X | X |
| PI | HDI 2015 | −0.0734 | −0.1 | −0.0355 | X | X |
| FFI | Family Ties (Alesina) | −1.05309 | −3.033 | 1.12 | | X |
| FFI | Family Ties (Fincher) | −0.1126 | −0.361 | 0.1245 | | X |
| FFI | Contemporary Patriarchy | −0.439 | −1.3859 | 0 | | X |
| FFI | 30–39 with parents | −0.0615 | −0.1421 | −0.0226 | X | |
| FFI | GII 2013 | −0.0059 | −0.0142 | 0 | | X |
| FFI | EVI | 7.2916 | 1.515 | 11.905 | X | X |
| FFI | GDP 2016 (ln) | 0.5459 | 0 | 1.1842 | | |
| FFI | HDI 2015 | 0.0129 | 0.0043 | 0.0266 | X | X |

Bootstrapped 95% confidence intervals based on 1,000 simulations.