Institutions, Demography, and Economic Growth

Tracy K. Dennison and Sheilagh Ogilvie

This article evaluates criticisms by Sarah G. Carmichael, Alexandra de Pleijt, Jan Luiten van Zanden, and Tine De Moor of our view of the European Marriage Pattern (EMP), and explains why their claims are incorrect. We elaborate our arguments concerning the institutional sources of economic growth, explore the relationship between women's position and the EMP, analyze the two-way links between demographic and economic behavior, and explicate aspects of our empirical analysis that these scholars find puzzling. The causes of European economic growth, we reiterate, are not to be found in the EMP but rather must be sought in the wider framework of nonfamilial institutions.

In a recently published article we examined the relationship between demography, institutions, and economic growth in early modern Europe (Dennison and Ogilvie 2014), focussing on recent claims that the European Marriage Pattern (EMP) was the institution that caused European economic growth. Analyzing 4,705 observations of demographic behavior for 39 countries, we found no evidence of the claimed relationship, nor any empirical support for the idea that the EMP improved female autonomy, increased human capital investment, enhanced demographic responsiveness to economic conditions, or created growth-inducing cultural norms. The institutional sources of economic growth, we concluded, resided in nonfamilial institutions, which differed across societies, not in the EMP, which was shared by fast- and slow-growing economies alike.

Carmichael, de Pleijt, van Zanden, and De Moor (CPZM), although agreeing with our broader conclusions about the significance of underlying nonfamilial institutional arrangements, criticize our findings. This article refutes their criticisms, and elaborates our arguments concerning the relationship between institutions, demography and growth.

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INSTITUTIONS

We have long argued that institutions influence economic outcomes (Ogilvie 2001, 2003, 2011; Dennison and Ogilvie 2007; Dennison 2011a, 2011b, 2013). However, the key institution favoring economic growth in Europe cannot have been the family system (Dennison and Ogilvie 2014, pp. 673–80, 684–87). Observing an institution in a successful economy does not necessarily imply a causal relationship: the institution may be present because of the economy's success, or the successful economy may perform well for other underlying reasons, despite, rather than because of, any specific institution. To identify which institutions contribute to success in successful economies, and which do not, requires careful empirical investigation.

In order to provide institutional explanations for economic growth, we need to identify institutional *differences* between slow- and fast-growing economies. The EMP, we argue, was not one of these differences. The EMP was associated with rapid growth in some early modern economies, such as England and the Netherlands, but with slow growth in others, including Scandinavia, Germany, Austria, and Bohemia (Dennison and Ogilvie 2014, pp. 659–72). The economic success of England and the Netherlands cannot be explained in terms of a phenomenon that they shared with many other economies that grew much more slowly.

CPZM criticize us for failing to acknowledge that the characteristics of the EMP were "outcome variables that change with the changing nature of economic circumstances." In fact, we point out the endogeneity of demographic decisions repeatedly in our article (Dennison and Ogilvie 2014, pp. 672–73, 677). That institutions, such as marriage systems, are embedded in larger institutional frameworks is something we have long emphasized (Dennison 2011a, 2011b, 2013; Ogilvie 2007; Ogilvie and Carus 2014). However, the institutional frameworks in which the EMP was embedded were not ones that invariably facilitated economic growth (Dennison and Ogilvie 2014, pp. 673–77, 684–87). Available scholarship suggests, and CPZM themselves acknowledge, that the demographic practices highlighted in the EMP required a framework of strong nonfamilial institutions that could substitute for the labor, insurance, and welfare services that families could not provide when marriage was non-universal and households small. But such nonfamilial institutions were not always ones that favored economic growth. In some cases, they included "generalized" institutions, such as relatively impartial states and reasonably well-functioning factor and product markets, which

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were open to participation by broad social strata.[1] EMP countries such as England and the Netherlands (the focus of the "girlpower" thesis) experienced successful economic growth to the extent that they developed and maintained such generalized institutions. In other cases, the wider institutional framework surrounding the EMP consisted of "particularized" institutions such as closed corporate communities, occupational guilds, manorial systems, religious bodies, and absolutist states, which allocated resources inefficiently and excluded many people from full economic participation. EMP countries such as Germany, Austria, Switzerland, Bohemia, and Sweden, where particularized institutions were entrenched, suffered from low per capita incomes and slow economic growth. We do not dispute that institutions affect economic performance, but point out theoretical and empirical reasons for focussing on the wider framework of nonfamilial institutions, not the EMP, as the key institutional influence on European growth.

WOMEN'S POSITION

CPZM argue that we place insufficient emphasis on the importance of female autonomy for economic growth. They maintain that the EMP was critical to the emergence of female agency, which in turn benefited the economy. While we agree that female autonomy benefits economic growth (Ogilvie and Edwards 2000; Ogilvie 2003; Dennison 2011a; Dennison and Ogilvie 2014, p. 676), we found no evidence that the EMP was either necessary or sufficient for creating female autonomy (Dennison and Ogilvie 2014, pp. 672–76). Quantitative indicators of women's agency such as female household headship, female labor force participation, and female wage rates were not uniformly high in EMP societies or uniformly low in non-EMP societies. More qualitative indicators of women's position, including property rights, inheritance, and credit market participation, point in the same direction. Devising rigorous qualitative indicators of female autonomy that are comparable across societies is a challenge for future research.

Women had a good economic position in some societies with the EMP, notably England and the Netherlands, but these countries were also distinctive in their per capita incomes, relative factor prices, resource endowments, geopolitical position, commercial participation,

[1] On the distinction between generalized and particularized institutions see Ogilvie 2011, pp. 193–94, 428ff, and Ogilvie and Carus 2014, pp. 428–36.

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parliamentary governments, legal systems, credit markets, and early liberalization of corporative, communal, and seigneurial institutions—all variables which have been ascribed a causal role in enhancing female autonomy and economic growth. Moreover, women had a much worse position in a number of societies in nordic, central, and eastern-central Europe where the EMP prevailed to an equal or greater degree (Dennison and Ogilvie 2014, pp. 673–74). To explain English and Dutch distinctiveness in female autonomy and economic performance, one cannot invoke the EMP, which England and the Netherlands shared with many other societies in which women were more thoroughly excluded from economic participation and economic growth was slow.

The research studies we referred to in our article indicate that both women's position and economic growth were strongly influenced by other institutions, regardless of marriage or family pattern (Dennison and Ogilvie 2014, pp. 674–76). This is consistent with our more general emphasis on the importance of the wider institutional framework for both female agency and economic growth. Craft guilds excluded women from vocational training and employment in Italy and Spain (in the absence of the EMP) and in Germany and Sweden (in its presence). Village communities restricted women's market participation in Russia (outside the EMP) and in Germany and Bohemia (where the EMP prevailed). The presence of the EMP did not prevent female household headship from being restricted by manorial institutions in Bohemia, and the absence of the EMP did not deter manorial institutions from permitting high female headship in Russia, where it suited landlords' interests. It was not the EMP but rather nonfamilial institutions—guilds, communities, serfdom, and many more—that influenced the extent to which women could obtain vocational training, head independent households, supply and employ labor, offer and obtain credit, buy, sell and rent land, and transact in product markets. These institutions, not the family system, determined whether women made a full contribution to the economy, whether markets worked well, whether resources were allocated efficiently, and whether the economy grew successfully.

THE RELATIONSHIP BETWEEN DEMOGRAPHY AND THE ECONOMY

CPZM argue that the EMP should not be measured in terms of "levels" of demographic statistics, such as marriage age. Instead, they contend, it should be assessed in terms of "a dynamic system," which they define in terms of cultural norms, female agency, and demographic responsiveness to economic circumstances. Redefining the EMP in this way, they

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argue, can explain why fast-growing England and the Netherlands did not, in fact, manifest the most "pure" or "extreme" variant of the EMP as had originally been contended (De Moor and van Zanden 2010, p. 4; Voigtländer and Voth 2006, pp. 323, 348). CPZM argue that England and the Netherlands failed to manifest the EMP in extreme form because English and Dutch people responded to successful economic growth by reducing their marriage age.

It is important to adopt a clear definition of the phenomenon to be investigated and to identify measurable indicators of that phenomenon. Fortunately, historical demographers have done precisely this for the EMP, and we use that generally accepted definition and the measurable indicators associated with it. We do not focus solely on marriage age, as CPZM claim in their abstract, but analyze three separate demographic indicators: female age at first marriage, female lifetime celibacy, and nuclear-family household structure (Dennison and Ogilvie 2014, pp. 653–72). These measurable indicators constitute the mainstream definition of the EMP (see Hajnal 1982) and were previously accepted by the authors of the CPZM note (e.g., De Moor and van Zanden 2010, pp. 2, 7, 9, 17–19, 23). In addition, we analyze the mechanisms through which the EMP is argued to have caused economic growth, including the female agency, cultural norms, and demographic responsiveness invoked in CPZM's proposed redefinition (Dennison and Ogilvie 2014, pp. 672–84).

As just noted, there is no empirical support for the view that the EMP endowed women with a uniquely favorable economic position. Neither quantitative nor qualitative indicators of female agency were uniformly high in EMP societies or uniformly low in non-EMP societies (Dennison and Ogilvie 2014, pp. 672–76). Longitudinal evidence on English women's wages also casts doubt on a "girl-powered" economic breakthrough (Humphries and Weisdorf 2015). No rigorous measure of women's economic position supports the view that being characterized by the EMP enabled societies to achieve a distinctive degree of female agency.

We also examined the claim that societies with the EMP exhibited distinctive, growth-inducing norms and values (Dennison and Ogilvie 2014, pp. 683–85). We find no empirical support for the notion that either the EMP or economic growth was caused by specificities of English culture or Weberian Protestantism. Nor is there evidence for the proposition advanced by CPZM that medieval Christian dogma created cultural norms of consensual marriage that influenced demographic behavior. In fact, studies of the practical implementation of medieval ecclesiastical provisions concerning demographic behavior strongly emphasize the role

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played by underlying nonfamilial social institutions including property rights and legal systems. Associating the EMP with medieval Christian dogma is also problematic given that marriage and other familial practices varied enormously across Christian Europe and that the EMP was not the prevalent familial institution in those societies, such as Italy and Iberia, where the influence of the church was strongest (Dennison and Ogilvie 2014, pp. 684–85). The distribution of European marriage patterns that emerges from empirical research is not consistent with any notion that distinctive cultural norms determined either demographic behavior or economic growth.

The third component of CPZM's proposed redefinition of the EMP is the degree to which demographic behavior responds to economic circumstances. CPZM reiterate a claim advanced in some recent literature (and addressed in our article) that economies such as those of England and the Netherlands grew faster because the EMP made their demographic behavior particularly responsive to economic conditions (e.g., Voigtländer and Voth 2006; De Moor and van Zanden 2010). The elasticity of marriage and fertility with respect to economic signals does lend itself to empirical measurement and has generated a substantial literature (surveyed in Dennison and Ogilvie 2014, pp. 680–83). Our exploration of this literature found that demographic responsiveness to economic conditions did not depend on the EMP, since it was observed historically in societies as diverse as northern Italy and China, in which the EMP did not prevail. Nor was demographic responsiveness to economic conditions only found in successfully growing economies. In fact, it turns out to have been less pronounced in England than in a number of slower-growing European economies (Dennison and Ogilvie 2014, pp. 680–83). The gap in economic performance between England and other European (and non-European) societies cannot, therefore, be attributed to the EMP or to the way it may have mediated demographic responses to economic circumstances.

Abandoning the original claim that the EMP prevailed in its most "pure" form in England and the Netherlands, powering those countries' successful economic growth (De Moor and van Zanden 2010, p. 4), CPZM speculate that England and the Netherlands manifested a *moderate* form of the EMP precisely because their successful economic growth encouraged people to marry earlier. However, this reformulation of the EMP theory of European economic growth must also be treated with caution.

For the EMP to have "played a fundamental role in western Europe's economic development" (De Moor and van Zanden 2010, p. 1), fast-growing England and the Netherlands would have to have had a

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particularly extreme version of the EMP at some period. This period must lie some time before the early to mid-sixteenth century when our empirical analysis starts, by which point the data already reveal England and the Netherlands to have had a moderate form of the EMP. Very little is known about European marriage patterns before c. 1530 due to the lack of parish registers and village censuses which are required to calculate reliable statistics on marriage age, lifetime celibacy, and household structure. The few available data are insufficient to sustain the proposition that the Netherlands and England were demographically distinctive. Scattered and heavily debated observations have suggested a female marriage age of c. 20 for various localities in late medieval Europe, including Holland, England, Germany, southern France, and northern Italy (Smith 1979, pp. 77, 81; Dubois 1997, pp. 211, 214; Emigh 1997, pp. 625–26; Kowaleski 1999, pp. 326–28; Viazzo 2003, p. 133; Dalla-Zuanna et al. 2012, pp. 294, 296). Ascribing a marriage age of c. 20 in England and the Netherlands to rapid economic growth caused by the norms of the EMP, while ascribing the same marriage age in southern France or northern Italy to non-EMP norms of non-consensual marriage and female disempowerment, risks rendering the EMP theory of economic growth non-falsifiable.

A second problem is that the scattered data from the pre-parish-register era include statistics suggesting demographic behavior consistent with the EMP in medieval societies outside England and the Netherlands that were not characterized by notable economic growth. One study suggests a high lifetime celibacy rate in medieval northern France (Hallam 1985, p. 56), while another finds a high percentage of nuclear-family households in medieval Germany (Hammer 1983, p. 244). To the extent that any demographic statistics before 1500 can be relied upon, these would suggest that the EMP already prevailed in parts of Europe in the absence of significant economic growth. Conversely, some of the most reliable demographic statistics for Europe before 1500 come from northern Italy, which had the most successful and fastest-growing economy in medieval Europe, but also had a non-EMP demographic system characterized by early female marriage, low lifetime celibacy, and complex households (Smith 1979, p. 77; Kowaleski 1999, pp. 326–28; Dalla-Zuanna et al. 2012, pp. 294, 296).

In assessing the plausibility of the idea that an economic-growth-induced moderation in English and Dutch marriage ages occurred just at the point at which each country emerged into empirical observability, one must also bear in mind that economic growth can exert countervailing income and substitution effects on marriage behavior (Dennison and Ogilvie 2013, p. 20). A rise in wages increases incomes, encouraging

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people to consume more of all goods, including marriage, thereby reducing marriage age and celibacy. But a wage rise will also increase the opportunity cost of withdrawing from the labor force, reducing women's incentives to marry, thereby *increasing* marriage age and celibacy. The whole EMP theory of economic growth is based on the idea that a rise in women's wages after the Black Death gave rise to later and non-universal marriage: it thus relies on the assumption that the substitution effect dominated the income effect. But CPZM's attempt to use rising wages to explain away the moderateness of English and Dutch marriage behavior relies on the opposite assumption, that the income effect dominated the substitution effect. Theoretically, the relative size of the income and substitution effects could have changed between the Black Death and the sixteenth century, but there is no evidence that any such change occurred. Seeking to explain away moderate English and Dutch marriage behavior by adducing a change in the relative magnitudes of the income and substitution effects for which there is no actual evidence again risks rendering the EMP theory of economic growth unfalsifiable. Note that if the substitution effect was the dominant one, economic growth would have encouraged people to marry *later*, not earlier, thus making CPZM's claim that the moderate form of the EMP observed in England and the Netherlands is the consequence of the effect of rising wages on marriage behavior impossible to sustain.

In so far as pre-parish-register data allow us to reach any conclusions, they indicate that economic growth occurred in EMP and non-EMP societies alike and that manifestations of the EMP prevailed in fast- and slow-growing economies alike. There is no evidence that the net effect of rising wages on marriage behavior switched from a dominant substitution effect to a dominant income effect just before Dutch and English demographic behavior becomes observable in the early sixteenth century. Furthermore, even once the Dutch and English economies started to grow, there is no evidence that this growth was caused by the EMP rather than by the many other features of these societies that have been emphasized by economic historians. These considerations make it highly unlikely that the moderate demographic behavior observed in England and the Netherlands as soon as reliable data become available can be ascribed to their having enjoyed a spurt of EMP-caused economic growth at an unobservable earlier period.

The theory that the EMP played a fundamental causal role in European economic growth suffers, finally, from the pervasive endogeneity among all the variables (Dennison and Ogilvie 2014, pp. 672–73, 677, 680). As soon as one acknowledges that demographic behavior interacts with economic conditions, one has to recognize the possibility that causality

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may run not just from the EMP to economic growth but also from economic conditions to demographic behavior, and that both economic growth and demographic behavior may be influenced by some set of underlying factors. The endogeneity of demographic and economic behavior is an important point, and its recognition by CPZM is a welcome development, but it only reinforces our argument that the EMP was not the cause of European economic growth.

DATA ON EUROPEAN DEMOGRAPHIC BEHAVIOR

CPZM express puzzlement about certain aspects of our empirical analysis. Their first concern is that we did not use the raw data hosted on the Mosaic, NAPP, IPUMS, and EHPS websites. Our article made clear, however, that we were analyzing statistics calculated by historical demographers (Dennison and Ogilvie 2014, pp. 653–58 and Online Appendix). We deliberately refrained from analyzing raw data. Generating statistics on marriage age, lifetime celibacy, and household structure from raw data in censuses, parish registers, and other primary sources requires months, often years, of rigorous analysis by researchers familiar with the sources, historical period, and underlying society. To calculate marriage age and lifetime celibacy for even one community typically requires undertaking the exceptionally labor-intensive project of a family reconstitution (Henry and Fleury 1956; Wrigley 1966). To obtain just one statistic on household complexity, singulate mean age of marriage, or age-specific celibacy for one community at one date requires analyzing an entire census-type listing (Laslett and Wall 1972). To aggregate raw data from such disparate and non-homogeneous sources would have defeated our purpose, which was to aggregate *findings*.

Furthermore, our 2014 article incorporated only statistical findings derived from studies in which the sources and methods had been subjected to some degree of peer review.[2] Restricting our data compilation to secondary studies made it possible to maintain data quality without seriously diminishing data quantity. We were able to assemble 4,705 demographic observations, an order of magnitude larger than any previous compilation (Dennison and Ogilvie 2014, pp. 653–58 and Online Appendix).

CPZM also note differences between our 2013 working paper and our 2014 article, and express concern that our data set contains relatively few

[2] Even then, we were careful to control for potential distortion arising from possible differences in peer reviewing among different types of scholarly dissemination (Dennison and Ogilvie 2014, pp. 657–58).

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observations for some countries. The basic difference between the two papers is that the published article included nearly 2,000 more observations than the working paper. The size of the data set under analysis is clearly described in both papers (Dennison and Ogilvie 2013, pp. 4–16 with Tables 1–3; Dennison and Ogilvie 2014, pp. 653–58 with Table 1). Our 2013 working paper was based on 175 research studies, from which we compiled a total of 2,731 observations of demographic behavior in 32 different European countries, 1,491 on female age at first marriage, 709 on female lifetime celibacy, and 531 on household structure. Our 2014 article substantially expanded this database by extracting data from 365 research studies in total, yielding 4,705 observations on demographic behavior in 39 different countries: 2,622 on women's age at first marriage, 1,172 on female lifetime celibacy, and 911 on household structure.

Both data sets revealed the same empirical patterns: the most "pure" or "extreme" manifestations of the EMP are not to be found in fast-growing economies such as England and the Netherlands (as claimed in De Moor and van Zanden 2010, p. 4; Voigtländer and Voth 2006, pp. 323, 348). Rather, they are observed in poorer and slower-growing economies in nordic, central, and eastern-central Europe (Dennison and Ogilvie 2014, pp. 659–72). In a Borda ranking of 30 European countries according to extremeness of the EMP, England lay about one-quarter of the way down the ranking and the Netherlands two-fifths of the way. Slow-growing economies such as Austria, Iceland, Norway, Denmark, Switzerland, Sweden, and Bohemia (under serfdom) showed significantly more extreme manifestations of the EMP than fast-growing England and the Netherlands.

There are, of course, some countries in our data set for which there are comparatively few observations, largely because of the lack of demographic research on those societies. However, the whole point of carrying out an econometric analysis and undertaking statistical hypothesis-testing is to assess the probability that a difference between two countries is not simply the result of sampling variation. If the number of observations were so small as to make it probable that apparent differences between countries merely resulted from sampling variation, then the hypothesis tests reported in our article would have shown that. Our analysis demonstrates that this is not the case. Thus we show that female marriage age in (fast-growing) England was lower than that of 11 (slower-growing) countries, and we test the null hypothesis that there is no difference between England and each of these countries. The value of the statistic used for this hypothesis test takes account of (*inter alia*) the number of observations available for the relevant countries. The null hypothesis of no difference

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between England and each of these countries is rejected, the probability that the null hypothesis is true being less than 5 percent. The Netherlands had female marriage age lower than much poorer and slower-growing Denmark and Sweden. The null hypothesis of no difference between these countries is again rejected: its probability of being true is less than 5 percent (Dennison and Ogilvie 2014, pp. 660–64). Female lifetime celibacy, likewise, was higher in 11 other (slower-growing) European countries than it was in England and higher in 12 other countries than it was in the Netherlands (Dennison and Ogilvie 2014, pp. 664–66). Similar statistical findings emerge from our analysis of household complexity (Dennison and Ogilvie 2014, pp. 666–69).

CPZM point out that our data set contains relatively few observations for Croatia, Belarus, the Baltic societies, Iceland, Malta, Romania, Serbia, Slovakia, Slovenia, and Ukraine. On the other hand, our analysis was based on 617 observations for Germany, 365 for England, 356 for northern France, 266 for the Netherlands, 220 for Belgium, 170 for Bohemia, 82 for Austria, 61 for Switzerland, 137 for Sweden, and 244 for the other four Scandinavian countries taken together. Obtaining more observations on the under-researched societies listed above would not reverse the finding that the fast-growing English and Dutch economies were characterized by moderate demographic patterns, whereas the slow-growing economies in Scandinavia and German-speaking central Europe had more extreme manifestations of the EMP. Certainly more data are always desirable, and one aim of our work was to stimulate additional research in historical demography. Such studies are needed not only for the under-researched parts of Europe, but for other continents as well, especially given claims that the EMP also caused economic divergence between China and Europe (Voigtländer and Voth 2006; De Moor and van Zanden 2010). It is unlikely, however, that collecting more data will do anything but reinforce the conclusion that the most extreme manifestations of the EMP in early modern Europe were not associated with rapid economic growth while the most successful European economies manifested a moderate demographic pattern.

CONCLUSION

The relationship between institutions, demography, and economic decisions can certainly cast light on long-term economic growth. However, it is important to recognize the problem of endogeneity and carefully analyze causal links. The arguments advanced in CPZM's comment on our article cannot be sustained. Recent literature putting the EMP

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at the heart of economic growth focuses primarily on England and the Netherlands. But these two countries did not have an extreme version of the EMP, although they were distinctive in other respects, notably in having more "generalized" institutions. The most extreme manifestations of the EMP prevailed in slow-growing economies such as those in central and nordic Europe, where "particularized" institutions predominated and per capita incomes remained low. No redefinition of the EMP can alter this finding. Women's autonomy and well-functioning market institutions certainly benefited economic growth, but it was the wider framework of nonfamilial institutions, not the EMP, that determined whether all economic agents (including women) could make a full contribution to the economy, whether markets worked well, and whether the economy grew successfully.

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