# *"Do Inheritance Customs Affect Political and Social Inequality?": Replication and Analysis Extension*

### Abstract

*Do fairer inheritances succeed in producing more equal societies? This article has two objectives. On the one hand, it evaluates hypotheses about the relationship between inheritance customs and political, social, and economic inequality in Germany. On the other hand, it proposes a final robustness assessment of the results. The case used is German municipalities and regression analyses are conducted (Ordinary Least Squares method). The main findings confirm the conclusions presented by Hager and Hilbig (2019) that German municipalities with equitable inheritance customs elect more women in their councils and have fewer aristocrats in their societies. In addition, it is shown that equitable inheritance practices decrease women's political participation (when is considered welfare spending) as well as decrease current unemployment rate. Finally, we find that applying an imputation method on the dataset, we keep a greater number of observations and also achieve the results provided by Hager and Hilbig. However, some issues related to models fit are still identified. Regarding multicollinearity, our analyzes show that the predictor set included in the regression models do not correlate with each other.*

### Introduction

To address the reasons why some societies are more unequal than others due to inheritance customs, this paper replicate some results obtained by Anselm Hager and Hanno Hilbig in "Do Inheritance Customs Affect Political and Social Inequality?" published in the American Journal of Political Science (2019). In addition, it is proposed an extension of the analysis considering the relationship between inheritance practices and certain variables coming from the economic realm as well as a robustness assessment of the findings.

First, we present briefly the research question and the hypotheses that will be subject to evaluation in this exercise. Second, we describe the methodology used including the characteristics of the German case, the database, and the research design made up of 12 simple regression models (OLS). Third, we present the empirical results divided into two parts: the replication results and then the analysis extension. Such extension includes the evaluation of: (a) conditional hypotheses in which welfare spending interacts with the presence of equitable inheritance in two different historical moments; (b) hypotheses that relate equitable inheritance with income distribution and unemployment rate; and (c) the robustness of the previous analyzes including references to missing data, estimators precision, and multicollinearity issues.

### Research question and hypotheses

In general terms, this paper is interested in examining the relationship between inheritance customs and equality; specifically, if equitable inheritance customs promote equality in the case of German municipalities. In this frame, we consider the following research question formulated by Hager and Hilbig

(2019): Do historic inheritance customs predict today's gender and class equality in the political and social field?

In a first approach, it is possible to argue that the inheritance transfer customs based on the primogeniture and the exclusion of women as legitimate recipients of wealth, could have negative effects on equality in the social and political realm. In fact, this idea is not new and comes from the French revolution since it was argued that unequal inheritance between siblings was responsible for strict hierarchies and unfairness. Consequently, a first hypothesis to examine here is:

> "*H1*: Equitable inheritance customs engender gender and class equality in the political and social realm" (2019: 760).

Then, following Tocqueville and other American revolutionaries' ideas, Hager and Hilbig argue that "equitable inheritance customs engender social and political equality (a) by fairly apportioning wealth and (b) by spurring pro-egalitarian preferences" (2019: 759). From there, the following hypothesis is also established:

> "*H2*: Equitable inheritance customs reduce wealth inequality" (2019: 761).

In a final step, Hager and Hilbig explore whether equitable inheritance customs predict income equality. Although they do not explicitly state the hypothesis, they expect that equitable inheritance practices predict positively income equality.

It is precisely on this point that the extension of the analysis will be carried out. We will address the relationships between equitable inheritance and some typical economic variables.

First, we will expect that the presence of equitable inheritance customs affects positively on women's incorporation into politics only if an expansion of the Welfare State is verified:

> *H3: Equitable inheritance customs increase women's political participation in local councils only if it is verified a growth rate in welfare recipients per capita (2014).*

At the same time, and just to corroborate the trend, we introduce the same conditional hypothesis but with historical data about the expansion of the welfare expenditure in 1890:

> *H4: Equitable inheritance customs increase women's political participation in local councils only if it was verified a growth in per capita spending on the poor in 1890.*

Second, we will explore what relationship exists between equitable inheritance and unemployment:

> *H5: Equitable inheritance customs decrease unemployment rate (2014).*

Although the authors of the reference document show that, counterintuitively, equitable inheritance is associated with an increase in income inequality if they take the Gini income index (finding that, by the way, would be explained by individual talent differences and not by a structural condition such as the law of inheritance); it is still an interesting question to explore if fair inheritance practices have an effect on some form of equalization, such as unemployment rates.

**Methodology: the case, the database, and the design**

The case selected is Germany due to is a country "with pronounced local-level variation in historic inheritance customs" (Hager and Hilbig, 2019: 758). This case characteristic offers a rich laboratory to test the stated hypotheses, especially in Germany's southwest where inheritance customs regularly varied from one village to the next.

Regarding the database, it is considered that the most comprehensive data on German inheritance customs have been collected by Helmut Röhm (1957) who worked with a detailed questionnaire sent to all

German municipalities. For this reason and because contemporary municipality-level evidence is not available, it has been decided to rely on the historic data gathered by Röhm knowing that as there are currently more municipalities, the historic data in this study will "likely underestimate the true current treatment effect" (2019: 763). Nevertheless, it is argued that the results will be at least, a minimum threshold.

Furthermore, due to the evidence obtained in qualitative interviews and previous quantitative analyzes, the authors whose paper we replicate in the first part of this exercise find that "the historical customs of agricultural inheritance continue to form inheritance patterns to this day" (2019: 763). For this reason, the reproduction of historical inheritance practices (sometimes over 100 years old) allows us to base our decision to continue working with historical data that has not been substantially modified even today.

With the adoption of this main database, the units of observations are the German municipalities (N=8670) and 47 variables are considered.

Regarding the design, after a theoretical revision and following the recommendations of Hager and Hilbig (2019), we can expect inheritance customs to affect the distribution of resources for two particular groups. On the one hand, "women" (as opposed to men) and identified as a historically disadvantaged group. On the other hand, "aristocrats" (as opposed to non-aristocrats), recognized as a historically favored group. Having these groups identified, our authors asses positional differences considering political representation and social status because "historically speaking, inheritance reforms were clearly intended to strengthen women's political clout and to undermine the social status of the noble class" (Hager and Hilbig, 2019: 763).

From there, in the first part of this paper, we will replicate estimations to measure municipality-level gender inequality in two ways: 1) through the share of women in political councils in 2014 and 2) through the share of women in local Rotary International chapters, "a self-proclaimed club representing the social 'elite'" (Hager and Hilbig, 2019: 763). At the same time, as suggested by our authors, we will measure municipality-level class inequality using 1) the share of aristocrats and 2) ancient aristocrats in Rotary clubs.

Specifically, simple regressions are conducted using Ordinary Least Squares and considering the following main dependent variables:

- *Women in Local Political Councils* (to asses gender inequality)
- *Women in Rotary Clubs* (to asses gender inequality)
- *Aristocrats in Rotary Clubs* (to asses class inequality)
- *Ancient Aristocrats in Rotary Clubs* (to asses class inequality)

In addition, the independent variables include:

- *Equitable inheritance*[1]
- *Child labor*[2]
- *Welfare expenditure*[3]
- *Council size*[4]

---

[1] Equitable inheritance (fair_dic) is a dummy variable: (1) if the majority of the municipality historically used multigeniture, (2) otherwise (generally primogeniture).
[2] Child labor (childlabor_mean_1898) is the percentage of children working, 1898. It is argued that gender and class equality may historically have been affected by the extent to which child labor was practiced.
[3] Welfare expenditure (support_expenses_total_capita) is the per capita spending on the poor (1890). The authors introduce this variable considering that the stronger the Welfare State, presumably equality is more expected.
[4] Municipal council size (gem_council) (2016). The authors include this variable due to previously found evidence that council size positively predicts female representation.

- *Population density*[5]
- *Total population*[6]
- *Code civil* (a category of "Legal systems regarding land ownership" variable)[7]
- *Common law* (a category of "Legal systems regarding land ownership" variable)
- *Danish law* (a category of "Legal systems regarding land ownership" variable)
- *Prussian land law* (a category of "Legal systems regarding land ownership" variable)

In short, the regression models that are replicated here are as follows:

1. **Women in Local Political Councils** = $\beta_0 + \beta_1$(Equitable inheritance) + $\epsilon$
2. **Women in Rotary Clubs** = $\beta_0 + \beta_1$(Equitable inheritance) + $\epsilon$
3. **Aristocrats in Rotary Clubs** = $\beta_0 + \beta_1$(Equitable inheritance) + $\epsilon$
4. **Ancient Aristocrats in Rotary Clubs** = $\beta_0 + \beta_1$(Equitable inheritance) + $\epsilon$
5. **Women in Local Political Councils** = $\beta_0 + \beta_1$(Equitable inheritance) + $\beta_2$(Child labor) + $\beta_3$(Welfare expenditure) + $\beta_4$(Council size) + $\beta_5$(Population density) + $\beta_6$(Total population) + $\beta_7$(Code civil) + $\beta_8$(Common law) + $\beta_9$(Danish law) + $\beta_{10}$(Prussian land law) + $\epsilon$
6. **Women in Rotary Clubs** = $\beta_0 + \beta_1$(Equitable inheritance) + $\beta_2$(Child labor) + $\beta_3$(Welfare expenditure) + $\beta_4$(Population density) + $\beta_5$(Total population) + $\beta_6$(Code civil) + $\beta_7$(Common law) + $\beta_8$(Danish law) + $\beta_9$(Prussian land law) + $\epsilon$
7. **Aristocrats in Rotary Clubs** = $\beta_0 + \beta_1$(Equitable inheritance) + $\beta_2$(Child labor) + $\beta_3$(Welfare expenditure) + $\beta_4$(Population density) + $\beta_5$(Total population) + $\beta_6$(Code civil) + $\beta_7$(Common law) + $\beta_8$(Danish law) + $\beta_9$(Prussian land law) + $\epsilon$
8. **Ancient Aristocrats in Rotary Clubs** = $\beta_0 + \beta_1$(Equitable inheritance) + $\beta_2$(Child labor) + $\beta_3$(Welfare expenditure) + $\beta_4$(Population density) + $\beta_5$(Total population) + $\beta_6$(Code civil) + $\beta_7$(Common law) + $\beta_8$(Danish law) + $\beta_9$(Prussian land law) + $\epsilon$

In the second part of the paper, we propose an analysis extension.

Initially, we address the relationships between equitable inheritance and typical economic variables. We focus on the effect of equitable inheritance on women's political participation when is considered the welfare expenditure. In this case, the regression equation will be:

9. **Women in Local Political Councils** = $\beta 0 + \beta 1$(Equitable inheritance) + $\beta 2$(Welfare recipients per capita 2014) + $\beta 3$(Equitable inheritance* Welfare recipients per capita 2014) + $\epsilon$

At the same time, we hypothesize about the same possible interaction but with historical data about the expansion of the welfare state in 1890.

10. **Women in Local Political Councils** = $\beta_0 + \beta_1$(Equitable inheritance) + $\beta_2$(Welfare spending per capita 1890) + $\beta_3$(Equitable inheritance* Welfare spending per capita 1890) + $\epsilon$

Then, we test the effect of equitable inheritance customs on wealth distribution and unemployment rate by establishing the following linear model regression equations:

---

[5] Population density (gem_pop_density) per square km (2014). After theoretical revision, the authors find interesting the introduction of this variable due to prior evidence about positive correlation between population density and women participation in political sciences.

[6] Total population (pop_tot) (2014).

[7] Legal systems regarding land ownership (law_cat) are the legal codes prevailing in 1894. The four categories are: Code civil (which adopts equitable inheritance customs), Common law, Danish law, and Prussian land law.

11. **Unemployment rate (2014)** = $\beta_0 + \beta_1$(Equitable inheritance) + $\epsilon$

12. **Within-municipality Gini of reported labor income on tax records (2014)** = $\beta_0$ + $\beta_1$(Equitable inheritance) + $\epsilon$

In the second part of the extension analysis, we evaluate the robustness of previous analyses. This includes: (a) the examination of missingness data; (b) the application of an imputation methodology according to the type of dataset; (c) the assessment of precision estimators; and (d) the evaluation of multicollinearity issues by testing different analytical strategies.

**Empirical results**

**First part: replication results**

In order to assess the relationships between equitable inheritance and gender and class equality in German municipalities (hypothesis 1), the first estimations are simple linear models corresponding to the previous regression equations numbers 1, 2, 3, and 4.

The replication results are shown in Table 1: "Equitable Inheritance and Inequality".

If we first consider gender inequality, we observe in Model 1 that equitable inheritance is associated with an increase in the share of women in local political councils by 2.8 percentage points. In this case, the coefficient is statistically significant at $p<0.01$ with standard error of 0.003 which means a precise estimation.

In Model 2, results indicate that equitable inheritance increases the women's participation in Rotary clubs by 3.7 percentage points. However, this coefficient is not statistically significant.

If we turn now to class inequality, in Model 3 we obtain a negative coefficient. This indicates that the equitable inheritance decreases the number of aristocrats in Rotary clubs in municipalities by 21.7 percentage points (statistically significant at $p<0.05$). This finding is confirmed -but with less accurate results and a non-significant coefficient- when the model focuses on ancient aristocrats in Rotary clubs (Model 4). According to Hager and Hilbig, this estimate "is less precise because there are few aristocrats from the 'ancient' aristocracy in our data" (2019: 763).

TABLE 1: Equitable Inheritance and Inequality

| | Dependent variables: | | | |
|---|---|---|---|---|
| | Women in Local Political Councils (1) | Women in Rotary Clubs (2) | Aristocrats in Rotary Clubs (3) | Ancient Aristocrats in Rotary Clubs (4) |
| Equitable Inheritance | 0.028*** (0.003) | 0.037 (0.094) | -0.217** (0.093) | -0.056 (0.094) |
| Observations | 3,944 | 600 | 600 | 600 |

Note: *p<0.1; **p<0.05; ***p<0.01
Standard errors are given in parentheses.

In summary, running these models we find that German municipalities that historically adopted equitable inheritance customs, to this day, elect more women into political councils and have fewer aristocrats in the social elite. Therefore, the evidence allows us to state that in German municipalities, equitable inheritance customs are associated with greater social and political equality.

The second group of estimations includes other simple linear models corresponding to the regression equations number 5, 6, 7, and 8 whose replication outcomes are shown in the following Table 2: "Equitable Inheritance and Inequality (Controls included)".

TABLE 2: Equitable Inheritance and Inequality (Controls Included)

| | Dependent variables: | | | |
|---|---|---|---|---|
| | Women in Local Political Councils (1) | Women in Rotary Clubs (2) | Aristocrats in Rotary Clubs (3) | Ancient Aristocrats in Rotary Clubs (4) |
| Equitable inheritance | 0.011*** (0.004) | 0.064 (0.116) | -0.241* (0.128) | -0.079 (0.124) |
| Child labor | -0.0004 (0.001) | -0.026 (0.028) | 0.057* (0.031) | 0.071** (0.030) |
| Welfare expenditure | 0.001 (0.002) | 0.049 (0.053) | -0.009 (0.059) | 0.008 (0.057) |
| Council size | 0.008*** (0.003) | | | |
| Population density | 0.031*** (0.002) | 0.028 (0.048) | -0.024 (0.053) | -0.049 (0.052) |
| Total population | 0.002 (0.002) | -0.026 (0.020) | 0.028 (0.022) | 0.050** (0.021) |
| Code civil | -0.031*** (0.008) | 0.027 (0.237) | 0.287 (0.263) | 0.485* (0.256) |
| Common law | -0.018** (0.007) | -0.222 (0.236) | 0.567** (0.261) | 0.608** (0.254) |
| Danish law | -0.019 (0.014) | -0.030 (0.446) | 0.313 (0.494) | 0.599 (0.480) |
| Prussian land law | -0.024*** (0.008) | 0.016 (0.230) | 0.129 (0.255) | 0.353 (0.248) |
| Constant | 0.235*** (0.011) | 0.115 (0.350) | -0.622 (0.388) | -0.921** (0.377) |
| Observations | 3,851 | 475 | 475 | 475 |
| VIF (mean) | 2.144 | 1.704 | 1.704 | 1.704 |
| Tolerance (mean) | 0.5377 | 0.634 | 0.634 | 0.634 |
| R2 | 0.134 | 0.019 | 0.036 | 0.033 |
| Adjusted R2 | 0.131 | -0.0003 | 0.017 | 0.014 |
| Residual Std. Error | 0.086 (df = 3840) | 0.973 (df = 465) | 1.078 (df = 465) | 1.048 (df = 465) |
| F Statistic | 59.179*** (df = 10; 3840) | 0.983 (df = 9; 465) | 1.907** (df = 9; 465) | 1.746* (df = 9; 465) |

Note: *p<0.1; **p<0.05; ***p<0.01
Standard errors are given in parentheses.

As previously mentioned, a series of control variables (or "potential co-founders") are included due to their effects on the dependent variable could be interesting considering previous results reviewed in the literature on the subject.

First, we continue to see a statistically significant association between equitable inheritance customs and female representation in local councils and a reduction of aristocrats in Rotary clubs.

Second, child labor has been included as a possible explanatory variable because it is argued that equality may historically have been affected by the percentage of child labor. The outcomes show that child

labor is associated with a decrease in the number of women in local political councils but with a non-significative coefficient. On the other hand, we can say that child labor increases the number or aristocrats in Rotary clubs by 5.7 percentage points (statistically significant at p<0.1).

Third, regarding welfare expenditure (Welfare State expansion), we observe that its effect on the dependent variables is in all the cases non-statistically significant for the data analyzed.

Fourth, we find that council size predicts positively female participation in local political councils: it produces an increase of the dependent variable by 0.8 percentage points at p<0.01 level of confidence. At the same time, it is also observed that population density increases women's political participation in local council by 3.1 percentage points at p<0.01 level of confidence.

Fifth, as it is considered that gender and class equality may historically have been affected by regulations regarding land ownership, we introduce four categories of this variable as possible cofounders. Considering the (French) Code civil, which is supposed to incorporate equitable inheritance practices, the results show that its presence decreases women's participation in local councils by about 3% at p<0.01 level of confidence. These counterintuitive results would justify further research in this regard. At the same time, Common law regulations presence decreases women's political participation in councils by 1.8% and increases the number of aristocrats and ancient ones in Rotary clubs by more than 50% at p<0.05. Finally, it is found that the Prussian land law presence in the municipalities analyzed decreases the women's political participation in councils by 2.4 percentage points with an accurate coefficient measure (p<0.01 level of confidence).

**Second part: analysis extension**

***The effect of equitable inheritance on women's political participation when is considered welfare spending***

In Table 2, we observe that welfare expenditure effects on the dependent variables are in all the cases non-statistically significant for the data analyzed. However, it is possible to assume that there is an interaction between welfare expansion and equitable inheritance customs considering the women's political participation as the dependent variable (see Table 1 of the Appendix). In general, greater incorporation of women into politics could be expected when there are equitable inheritance customs in circumstances of the Welfare State expansion.

As it can be seen in Figure 1, equitable inheritance customs matter in predicting women's political participation in 2014 when the welfare recipients per capita are until approximately 0.09: as the welfare recipients per capita increases until 0.09, the effect of equitable inheritance on women 'political participation decreases. This trend is also statistically significant for values of welfare recipients of 0.15 and higher.

These results contradict our hypothesis about the positive effect that equitable inheritance customs would have on women's political participation in local councils when it is verified a growth rate in welfare recipients per capita (2014). This interesting finding could be related to the fact that egalitarian inheritance customs would only have effect on the political insertion of women when they are not beneficiaries of social aid and, therefore, have time available to intervene in local politics. In this sense, we assume that the predominant activities of women receiving social assistance include jobs that have to do with the survival of their families and the private and domestic concerns that surround them.
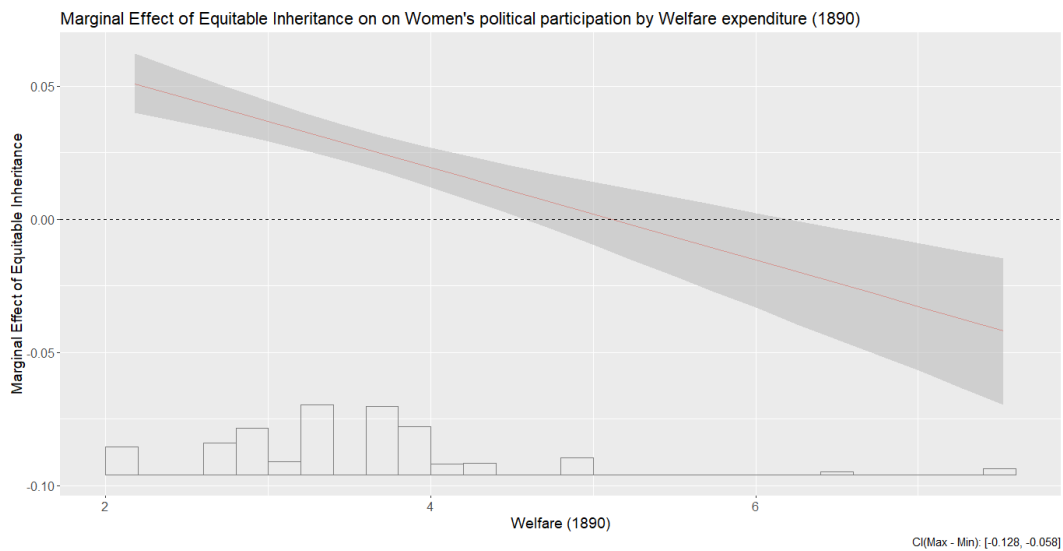
**Figure 1**

Marginal Effect of Equitable Inheritance on Women's political participation by Welfare expenditure (2014)



CI(Max - Min): [-0.196, -0.07]
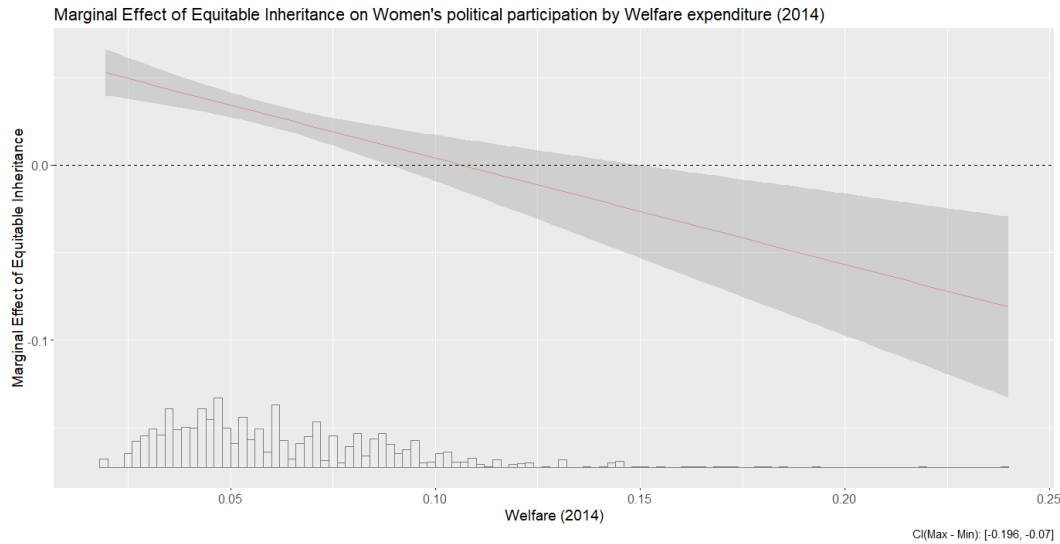
In light of these results, we could consider the same hypothesis but with welfare spending data from the end of the 19th century (hypothesis 4). In figure 2 we see that the trend described in the previous graph holds but with a considerably higher amount of spending per capita on poor people in 1890.

Clearly, these results seem to indicate that inheritance customs don't impact on women's political participation when it is verified the expansion of the welfare state.

**Figure 2**

Marginal Effect of Equitable Inheritance on on Women's political participation by Welfare expenditure (1890)



CI(Max - Min): [-0.128, -0.058]

***Equitable inheritance customs impact on income and unemployment rate***

The authors of the reference paper prove that, unexpectedly, equitable inheritance is associated with an increase in income inequality if they take into consideration the Gini index of incomes.

Hager and Hilbig (2019) find an explanation for this phenomenon distinguishing social or political inequality from income inequality because, presumably, the latter would be explained by the individual talent, not by the inheritance customs.

8

However, it is still interesting to maintain the question about the causal relationship between equitable inheritance practices and other current economic phenomena linked to equality.

In this direction, we could consider the possible effect of equitable inheritance not just on the Gini index but also on the German unemployment rate.

According to table 3 equitable inheritance practices have a negative impact on the wealth distribution index (as already was observed by our authors): its presence decreases the Gini index by 0.4 percentage points with a level of confidence of 0.01. As was mentioned above, this finding is contrary to the common-sense expectation but can have a good explanation when differences in income are defined by differences in individual capabilities.

Regarding the impact of equitable inheritance practices on unemployment rate, we find a positive statistically significant relationship at $p < 0.05$ level of confidence: the presence of egalitarian inheritance practices in German municipalities implies a 8.719 unit decrease in the current unemployment rate. Although the standard error is also higher, the presence of these ways of transfer inheritances seems to recreate an economic scenario in which unemployment goes down. This finding gives us evidence to support our hypothesis number 5 and would allow us to maintain that the distribution of wealth through inheritance would imply a dynamism in the economy related to the production of jobs.

Furthermore, the $R^2$ obtained is extremely low, which means a serious precision problem in this model but also in the rest as will be discussed in the next section.

TABLE 3: Impact of equitable inheritance on GINI of income and unemployment (2014)

| | Dependent variables: | |
| --- | --- | --- |
| | Within-municipality GINI of reported labor income (2014) (1) | Longterm unemployment rate (2014) (2) |
| Equitable inheritance | -0.004*** (0.001) | -8.719** (4.431) |
| Observations | 7,973 | 7,738 |
| R2 | 0.001 | 0.001 |
| Adjusted R2 | 0.001 | 0.0004 |
| Residual Std. Error | 0.046 (df = 7971) | 175.624 (df = 7736) |
| F Statistic | 9.740*** (df = 1; 7971) | 3.871** (df = 1; 7736) |

Note: *p<0.1; **p<0.05; ***p<0.01
Standard errors are given in parentheses.

### *Robustness analysis*

So far, few mentions have been included about the precision of the estimates. To do this, we will work with robustness analysis over the previous Table 2.

First, taking into account the original database (N = 8670 to indicate each one of the German municipalities considered), we observe a large amount of missing data. As we know, this situation can be problematic because it impacts on the number of observations finally included in the regression models.

As the missingness map shows (see Figure 1 and Table 2 in the Appendix) several missing values are registered for the predictors considered in Table 2. For this reason and given the characteristics of our dataset

(it is synchronous data per each municipality, not longitudinal data) it was decided to perform variable mean imputations.

Having now avoided null values, we run again the models whose results are shown below in Table 4. As can be seen, the number of observations that entered the regression models was substantially higher: 8663 in the first model (with only 6 missing string values in the variable law_cat whose means could not be calculated) and 599 observations in models 2, 3, and 4.

Regarding $R^2$, its values are very low (below 0.14) both in the Hager and Hilbig (2019) model as in the one calculated with the dataset free of null values. Although there are some variations when we consider more data, the $R^2$s are too small which means that the correlation between the predicted and the observed values of the dependent variables are extremely insignificant. This indicates that all the models considered by Hager and Hilbig (2019) and even the ones estimated with non-null data are not good models to predict the dependent variables. Considering the robustness of such results, these indices indicate a serious problem in terms of prediction accuracy.

In any case, when running the models with data obtained using the variable mean imputation method, we obtain, as expected, reduced standard errors due to the increment of the number of observations. Particularly in models 1 and 3 we also see the presence of new coefficients statistically significant in comparison with the same models conducted leaving the listwise deletion as default. Now, total population and Danish law impact significantly on the women's participation in local political councils as well as population density on aristocrats in Rotary Clubs.

Finally, some comments can be made regarding multicollinearity. If we take into consideration the pairwise correlation plot (Figure 2 in the Appendix) we can see that Total population has a moderate to high positive correlation with Council size (gem_council) (correlation index of 0.72). Likewise, Council size is correlated in moderate terms (with correlation indexes around 0.5) to other two predictors: Population density (gem_pop_density) and Welfare recipients per capita (2014) (welfare_recip_capita).

This situation could be problematic, but it is not definitive because we are limiting the analysis to only two variables (pairwise). So, the consideration of the Variance Inflation Factor (VIF) and Tolerances can exhibit a more conclusive multicollinearity assessment.

On the one hand, the mean of VIF is shown in Table 2, and in all the models its values are lower than 10 (according to the cutoff suggested by Chatterjee and Hadi, 2015) which indicates that these predictors have not multicollinearity problems. On the other hand, the mean of Tolerance values is in all the models around 0.60: a value far away from zero which implies no multicollinearity issues. These results are confirmed for VIF and Tolerance values in the case of every single predictor included in models (see Table 3 in Appendix).

In summary, the used data don't show multicollinearity problems that could make it difficult to establish the effects that each independent variables produce on the dependent variables. In this sense, the robustness of the analysis is guaranteed.

TABLE 4: Equitable Inheritance and Inequality (Controls Included) with variable mean imputations

| | Dependent variables: | | | |
| | Women in Local Political Councils (1) | Women in Rotary Clubs (2) | Aristocrats in Rotary Clubs (3) | Ancient Aristocrats in Rotary Clubs (4) |
|---|---|---|---|---|
| Equitable inheritance | 0.005*** (0.002) | 0.060 (0.103) | -0.229** (0.102) | -0.054 (0.103) |
| Child labor | -0.0001 (0.0004) | -0.030 (0.025) | 0.055** (0.025) | 0.060** (0.025) |
| Welfare expenditure | 0.001 (0.001) | 0.042 (0.047) | -0.011 (0.047) | 0.012 (0.047) |
| Council size | 0.005*** (0.001) | | | |
| Population density | 0.029*** (0.001) | -0.006 (0.027) | 0.050* (0.027) | 0.030 (0.027) |
| Total population | 0.003*** (0.001) | -0.011 (0.016) | 0.009 (0.015) | 0.027* (0.016) |
| Code civil | -0.016*** (0.004) | -0.067 (0.215) | 0.194 (0.212) | 0.390* (0.214) |
| Common law | -0.013*** (0.004) | -0.177 (0.216) | 0.465** (0.213) | 0.493** (0.215) |
| Danish law | -0.012** (0.005) | -0.182 (0.397) | 0.093 (0.392) | 0.360 (0.395) |
| Prussian land law | -0.019*** (0.004) | 0.110 (0.215) | 0.072 (0.212) | 0.316 (0.213) |
| Constant | 0.232*** (0.005) | 0.087 (0.313) | -0.518* (0.308) | -0.785** (0.311) |
| Observations | 8,663 | 599 | 599 | 599 |
| R2 | 0.142 | 0.013 | 0.038 | 0.025 |
| Adjusted R2 | 0.141 | -0.002 | 0.024 | 0.010 |
| Residual Std. Error | 0.058 (df = 8652) | 1.0002 (df = 589) | 0.989 (df = 589) | 0.996 (df = 589) |
| F Statistic | 143.554*** (df = 10; 8652) | 0.876 (df = 9; 589) | 2.610*** (df = 9; 589) | 1.658* (df = 9; 589) |

Note: *p<0.1; **p<0.05; ***p<0.01
Standard errors are given in parentheses.

## Conclusions

This article set out to evaluate hypotheses about the relationship between inheritance customs and political, social, and economic inequality in Germany. At the same time, it is proposed a final robustness assessment of the results.

The main findings can be summarized in four points.

First, German municipalities that historically adopted equitable inheritance customs elect more women into political councils and have fewer aristocrats in the social elite. Therefore, the evidence allows us

11

to state that in German municipalities, equitable inheritance customs are associated with greater social and political equality.

Second, fair inheritance customs don't impact on women's political participation when it is verified the expansion of the welfare state. On the contrary, it has been observed that equitable inheritance practices have a negative impact on the insertion of women into political life when the welfare expenditure increases. Perhaps, this situation is due to the fact that in states where social assistance is needed, women's roles are presumably more linked to caring for the family in the domestic sphere and to ensuring economic survival, which would delay their insertion in political life.

Third, equitable inheritance customs diminish wealth inequality in terms of unemployment rate reduction showing that the wealth distribution through inheritance would imply a dynamism in the economy related to the production of job positions. However, fair inheritance practices have a negative impact on the wealth distribution in terms of incomes (Gini index) probably due to that differences in income are better defined by differences in individual capabilities and not by structural conditions such as legal systems of inheritance transfer.

Fourth, regarding the robustness of these results, we find that with variable mean imputation method we avoid a substantial amount of missing data and we ratify the results obtained by Hager and Hilbig (2019) but obtaining reduced standard errors and the presence of new coefficients statistically significant. Nevertheless, the $R^2$s in all the models are still very low which indicates a considerable lack of precision in the estimations. Undoubtedly, this would deserve further research to produce better fit models. In addition, with respect to multicollinearity, the used data don't show multicollinearity issues after checking pairwise correlations between predictors as well as Variance Inflation Factors (VIF) and Tolerance estimations.

**References**

Chatterjee, S. and Hadi, A. S. (2015). Regression analysis by example. John Wiley & Sons, fifth edition.

Hager, A. and Hilbig, H. (2019). "Do Inheritance Customs Affect Political and Social Inequality?", *American Journal of Political Science*, Volume 63, Issue 4, pp. 758-773. Available online: https://onlinelibrary.wiley.com/doi/full/10.1111/ajps.12460

TABLE 1: Interaction models

| | Dependent variable: | |
| --- | --- | --- |
| | Women in Local Political Councils | |
| | (1) | (2) |
| Equitable inheritance | 0.089*** (0.012) | 0.064*** (0.009) |
| Welfare spending on poor 1890 (per capita) | 0.010*** (0.002) | |
| Equitable Inheritance * Welfare spending on poor 1890 (per capita) | -0.017*** (0.003) | |
| Welfare recipients 2014 (per capita) | | 0.599*** (0.062) |
| Equitable Inheritance * Welfare recipients 2014 (per capita) | | -0.604*** (0.147) |
| Constant | 0.183*** (0.008) | 0.179*** (0.004) |
| Observations | 3,944 | 3,926 |
| R2 | 0.024 | 0.040 |
| Adjusted R2 | 0.023 | 0.039 |
| Residual Std. Error | 0.091 (df = 3940) | 0.090 (df = 3922) |
| F Statistic | 32.273*** (df = 3; 3940) | 54.796*** (df = 3; 3922) |

Note:*p<0.1; **p<0.05; ***p<0.01
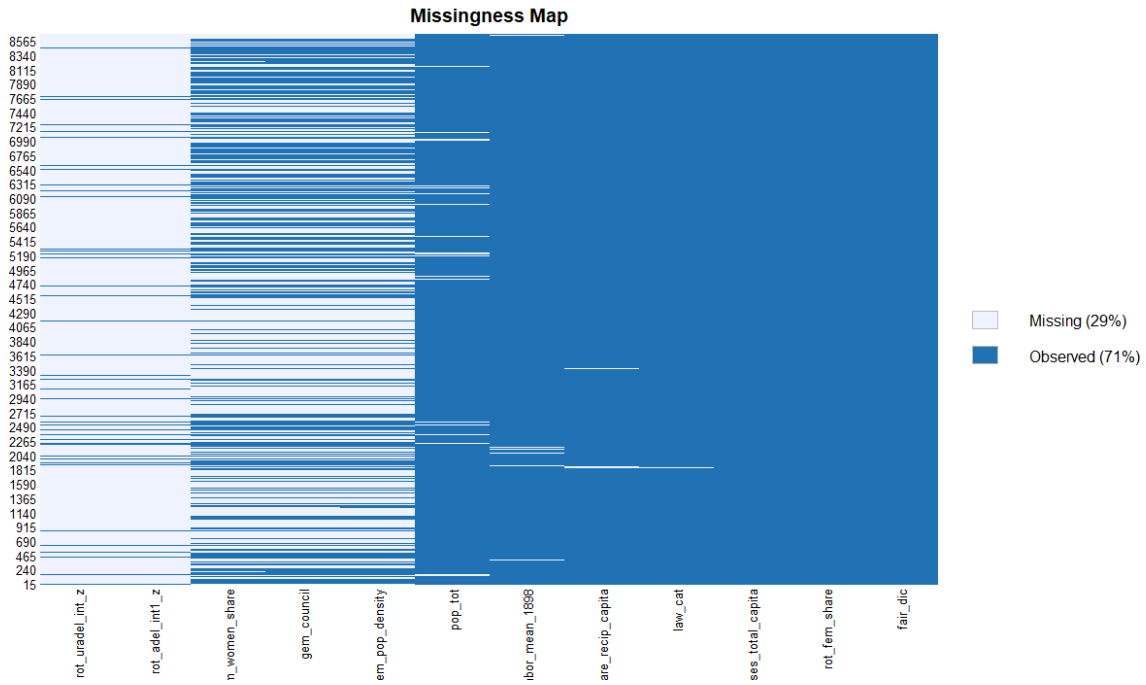Standard errors are given in parentheses.

**Figure 1**



Missingness Map

**Table 2: Number of missing values**

| | |
|---|---|
| rot_adel_int1_z | 8070 |
| rot_uradel_int_z | 8070 |
| gem_women_share | 4726 |
| gem_council | 4653 |
| gem_pop_density | 4649 |
| pop_tot | 277 |
| childlabor_mean_1898 | 91 |
| welfare_recip_capita | 43 |
| law_cat | 7 |
| support_expenses_total_capita | 2 |
| fair_dic | 0 |
| rot_fem_share | 0 |

**Figure 2: Pairwise correlation plot**
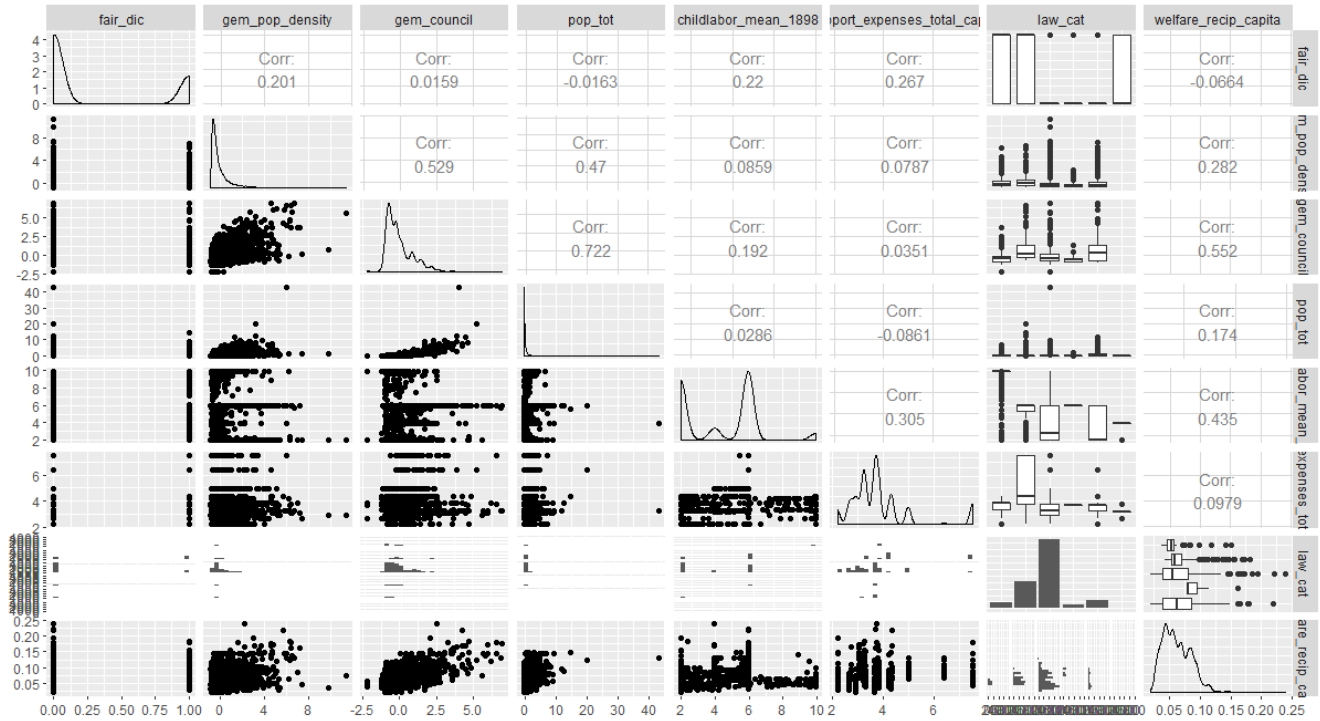


TABLE 3: VIF and Tolerance for predictors

| | (model 1) VIF (Tolerance) | (models 2, 3, and 4) VIF (Tolerance) |
|---|---|---|
| Equitable inheritance | 1.261 (0.793) | 1.199 (0.834) |
| Child labor | 2.451 (0.408) | 1.955 (0.512) |
| Welfare expenditure | 1.281 (0.781) | 1.261 (0.793) |
| Council size | 2.762 (0.362) | |
| Population density | 1.398 (0.715) | 1.546 (0.647) |
| Total population | 2.416 (0.414) | 1.534 (0.652) |
| Legal system (land ownership) | 3.439 (0.291) | 2.729 (0.366) |