

Weber Revisited: The Protestant Ethic and the Spirit of  
Nationalism.

Journal of Economic History 80(3), 710-745, 2020.

Online Appendix

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September 2020

**A Tables and Figures**

Table A.1: Lutherans and Reformed Protestants

	(1)	(2)
Panel 1: Dep. Var. Savings per Capita, 1875-1905		
Share Protestants	0.071 (0.081)	
Share Reformist		-0.029*** (0.009)
Share Lutherans		-0.074* (0.041)
Further Controls	Y	Y
N	2170	2170
$R^2$	0.359	0.356
Panel 2: Dep. Var. Literacy, 1871		
Share Protestants	0.099*** (0.010)	
Share Reformist		0.173** (0.082)
Share Lutherans		0.129*** (0.014)
Further Controls	Y	Y
N	452	452
$R^2$	0.737	0.735

*Notes:* In Panel 1 Standardized beta coefficients. Standard errors in parentheses. Robust standard errors clustered at the province level. Further controls include in Panel 1: number of savings banks, share working men above 14, share urban population, average household size, share other religions, dummy for counties w/o savings bank. Further controls include in Panel 2: % age below 10, % Jews, % females, % born in municipality, % of Prussian origin, average household size, population size (log), population growth 1867-1871 (in %), % missing education info, % blind, % deaf-mute, % insane. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

*Sources:* See Table B.1.

Table A.2: Polish Savings, Robustness

	(1)	(2)	(3)	(4)
	Savings p.c.		+ Pol. credit coop.	
Share Protestants	0.149 (0.117)	0.141 (0.118)	0.149 (0.118)	0.140 (0.119)
Share German Speaking	0.167*** (0.049)	0.177** (0.057)	0.152** (0.051)	0.163** (0.058)
Income per Capita		-0.047 (0.075)		-0.048 (0.075)
Further Controls	Y	Y	Y	Y
N	338	338	338	338
$R^2$	0.290	0.291	0.282	0.284

*Notes:* Standardized beta coefficients. Standard errors in parentheses. Robust standard errors clustered at the province level. Further controls: number of savings banks, share working men above 14, share urban population, average household size, share other religions, dummy for counties w/o savings bank. We exclude the provinces of Silesia and East Prussia. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

*Sources:* See Table B.1.

Table A.3: Polish Doctors in the Province Poznan, 1907

County	% Polish Doctors	% Mothertongue Polish
District Poznan		
Wreschen	0.44	0.78
Pleschen, Jarotschin	0.29	0.79
Schroda	0.13	0.84
Schrimm	0.33	0.78
Kosten, Schmiegel	0.50	0.83
Graetz	0.29	0.65
Neutomischel	0.25	0.65
Posen (Stadt)	0.38	0.47
Posen (Land)	0.28	0.70
Obornik	0.40	0.58
Samter	0.30	0.70
Birnbaum, Schwerin	0.27	0.31
Meseritz	0.20	0.20
Bomst	0.30	0.47
Fraustadt, Lissa	0.23	0.31
Gostyn, Rawitsch	0.36	0.68
Koschmin, Krotoschin	0.43	0.70
Adelnau, Ostrowo	0.44	0.81
Kempen, Schildberg	0.36	0.85
District Bromberg		
Czarnikau, Filehne	0.06	0.27
Kolmar	0.30	0.17
Wirnitz	0.25	0.46
Bromberg	0.10	0.28
Schubin, Znin	0.36	0.63
Hohensalza, Strelno	0.35	0.68
Mogilno	0.30	0.68
Gnesen, Witkowo	0.39	0.68
Wongrowitz	0.38	0.71

*Notes:* We identify Polish doctors via their last name. Every person with “ski” or “cz” or “zki” or “sz” or “tz” or “yz” or “zc” or “ow” or “wy” or “zy” in his lastname is classified as Polish doctor.

*Sources:* See Table B.1.

Table A.4: Effect of Protestantism on Literacy, 1871 (Using Distance to Wittenberg as IV)

	(1)	(2)	(3)	(4)	(5)
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Panel 1: OLS	Dep. Var. Literacy				
Share Protestants	0.099*** (0.010)	0.062*** (0.008)	0.057*** (0.009)	0.033*** (0.007)	0.040*** (0.007)
Share German Speaking		0.221*** (0.014)			0.213*** (0.016)
$R^2$	0.737	0.831	0.610	0.431	0.735
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Panel 2: Second Stage	Dep. Var. Literacy				
Share Protestants	0.189*** (0.028)	0.149*** (0.026)	0.182*** (0.024)	0.077*** (0.014)	0.145*** (0.021)
Share German Speaking		0.178*** (0.020)			0.173*** (0.022)
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Panel 3: First Stage	Dep. Var. Protestantism				
Distance to Wittenberg in km	-0.095*** (0.011)	-0.086*** (0.011)	-0.114*** (0.012)	-0.140*** (0.015)	-0.109*** (0.012)
Share German Speaking		0.404*** (0.073)			0.170 (0.106)
$R^2$	0.419	0.457	0.448	0.620	0.452
Including Eastern Provinces	Y	Y	Y	N	Y
Only Holy Roman Empire	N	N	Y	Y	Y
Further Controls	Y	Y	Y	Y	Y
F-Stat excluded instrument	74.19	64.21	96.12	89.27	85.32
N	452	452	378	280	378

*Notes:* Standard errors in parentheses. IV: Distance to Wittenberg. We show in Section ?? that distance to Wittenberg is not suitable as an instrumental variable, because it violates the exclusion restriction. Eastern provinces include East and West Prussia, Poznan, and Silesia. Further controls include: % age below 10, % Jews, % females, % born in municipality, % of Prussian origin, average household size, population size (log), population growth 1867-1871 (in %), % missing education info, % blind, % deaf-mute, % insane.. \* p<0.1, \*\* p<0.05, \*\*\* p<0.01. Note that the different standard errors between panel 1 column 5 in this table and Table 5 in Kersting et al. (2020) panel 1 column 3 are due to the use of clustered standard errors in Table 5 in Kersting et al. (2020). In this table, we rely on the exact specification by Becker and Woessmann (2009).

*Sources:* See Table B.1.

Table A.5: Literacy as Mediator, 1871

	(1)	(2)	(3)	(4)	(5)
	Dep. Var. Income Tax per Capita				
Total effect	-0.199 (0.201)	-0.315 (0.330)	0.835*** (0.272)	-0.246 (0.189)	0.842*** (0.278)
Direct effect	0.187* (0.103)	0.184 (0.143)	0.083 (0.083)	0.272* (0.152)	0.144 (0.088)
Indirect effect (literacy)	-0.039 (0.104)	-0.500 (0.434)	0.752*** (0.291)	-0.517* (0.303)	0.698*** (0.270)
Mediator explains	19.87%	158.42%	90.09%	210.57%	82.93%
Further controls	Y	Y	Y	Y	Y
Only HRE	Y	Y	N	N	Y
Including eastern provinces	Y	N	Y	N	Y
IV	Residual Decision		Distance to Wittenberg		
N	356	261	426	284	356

*Notes:* Standard errors in parentheses. Eastern provinces include East and West Prussia, Poznan, and Silesia. \* p<0.1, \*\* p<0.05, \*\*\* p<0.01. Further controls: % Jews, % females, % age below 10, % of Prussian origin, average household size, population size (log), population growth 1867-1871 (in %), % missing education info. Method: mediation analysis with IV (Dippel et al., 2018). For the computation we rely on the Stata package *ivmediate* provided by Dippel et al. (2020).

*Sources:* See Table B.1.

Table A.6: Spill-over Effect of Protestantism on Literacy among Catholics, 1871

	(1)	(2)	(3)
Panel 1: OLS	Dep. Var. Literacy among Catholics		
Share Protestants	0.020 (0.030)	-0.000 (0.019)	-0.000 (0.019)
Share German Speaking	0.269** (0.093)	0.324** (0.121)	0.324** (0.121)
$R^2$	0.667	0.525	0.525
Panel 2: Second Stage	Dep. Var. Literacy among Catholics		
Share Protestants	0.273 (0.179)	0.199* (0.096)	-0.057 (0.043)
Share German Speaking	0.145* (0.077)	0.248* (0.123)	0.346** (0.122)
Panel 3: First Stage	Dep. Var. Protestantism		
Distance to Wittenberg in km	-0.086** (0.038)	-0.109*** (0.032)	
Residual Decision 1624			45.369*** (2.866)
Share German Speaking	0.404** (0.160)	0.170 (0.160)	0.327** (0.144)
$R^2$	0.457	0.452	0.489
Further Controls	Y	Y	Y
Only Holy Roman Empire	N	Y	Y
N	452	378	378

*Notes:* Standard errors in parentheses. Further controls include: % age below 10, % Jews, % females, % born in municipality, % of Prussian origin, average household size, population size (log), population growth 1867-1871 (in %), % missing education info, % blind, % deaf-mute, % insane. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

*Sources:* See Table B.1.

## B Sources



Table B.1: Data Sources

Variable	Description	Years	Source
<b>Religion</b>			
Protestants	Share Protestants	1875, 1880, 1890, 1900, 1905	Galloway (2007)
Other religions	Share other religions, i.e. non-Catholic and non-Protestant	1875, 1880, 1890, 1900, 1905	Galloway (2007)
Reformed Protestants	Share reformed Protestants	1871	Königlich Statistisches Bureau (1875)
Literacy by Religion		1871	Galloway (2007)
<b>Savings</b>			
Number of savings-banks	Number of savings-banks	1875, 1882, 1888, 1898, 1904	Lehmann-Hasemeyer and Wahl (2017)
Deposits in savings-banks	Amount of deposits at savings-banks	1875, 1882, 1888, 1898, 1904	Lehmann-Hasemeyer and Wahl (2017)
Deposits in Polish credit cooperatives	Amount of deposits (equity and borrowed capital) at Polish credit cooperatives	1907	Politische Abteilung des königlichen Polizeipräsidiums in Posen (1909)
<b>Instrumental Variable</b>			
Ecclesiastical status	1 if data of Cantoni (2012) indicate that a prince-bishop or another clergyman ruled over the area		Spenkuch (2017) and Spenkuch and Tillmann (2018)
Reichsmatrikel	Contribution to the Imperial War Tax	1521	Zeumer (1913)

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<b>Variable</b>	<b>Description</b>	<b>Years</b>	<b>Source</b>
Protestant in 1624	1 if the prince who reigned over the corresponding area in 1624 decided to choose Protestantism over Catholicism	1624	Spenkuch (2017) and Schindling and Ziegler (1989, 1992, 1993b,a, 1995, 1996)
Printing Press	1 if data of Rubin (2014) indicate that at least one of the cities in a given county had a printing press at the beginning of the sixteenth century		
Latitude	Based on the coordinates of a counties' centroid		Own calculations using QGIS
Distance to Wittenberg	Distance to the city of Wittenberg		Own calculations using QGIS
<b>Ethnic Nationality</b>			
Mother tongue German	Share mother tongue German	1867 (partially), 1890	Galloway (2007), Belzyt (1998)
<b>Further Controls</b>			
Labor income per capita	Estimated by multiplying sector employment and wage data	1882, 1895, 1907	Kaiserliches Statistisches Amt (1884, 1897, 1910); Hoffmann (1965); Becker et al. (2014)
Average household size	Households divided by population	1875, 1880, 1890, 1900, 1905	Galloway (2007)
Urban population	Share urban population	1875, 1880, 1890, 1900, 1905	Galloway (2007)
Potential male working population	Share men above 15	1875, 1880, 1890, 1900, 1905	Galloway (2007)
Polish doctors	List of all doctors in the province Poznan	1905	Verband der Ärzte Deutschlands (1908)

*See next page*

<b>Variable</b>	<b>Description</b>	<b>Years</b>	<b>Source</b>
% age below 10, % Jews, % females, % born in municipality, % of Prussian origin, average household size, population size (log), population growth 1867-1871 (in %), % missing education info, % blind, % deaf-mute, % insane		1871	Becker and Woessmann (2009)

## C Protestantism and literacy rates: Direct comparison with Becker and Woessmann (2009)

The well-known paper by Becker and Woessmann (2009) – further BW – serves as an important reference point for our work. Therefore, we compare our findings with their main results along several dimensions.

First, we compare our main results from the cross-table and the 2SLS regression with the main findings from the IV-regression by BW. Using the cross-table, we find that Protestants are on average only slightly over-proportionally literate (one percentage point for the complete sample and 0.15 percentage points once we exclude the eastern provinces).<sup>1</sup> In our IV specification (Table 5 in Kersting et al. 2020), we find no significant effect of literacy. Moreover, our results from the cross-table show that the difference in literacy by religion is much bigger for regions in the East where the Polish minority lived (Figure 5 in Kersting et al. 2020). These findings stand in contrast to the results from Becker and Woessmann (2009, p.558): “In fact, the point estimate is significantly higher, with a difference in literacy of 18.9 percentage points between an all-Protestant and an all-Catholic county.” We exactly replicate their finding (column 2 in Table III in Becker and Woessmann (2009, p.559)), using distance to Wittenberg as an instrument, in column 1 in Table A.4. Thus, there seems to be a striking difference between, on the one hand, the relationship between Protestantism and literacy what BW measure, and, on the other hand, comparing literacy by religion based on the cross-table and our 2SLS results. Comparing Table A.4 column 5 with Table 5 in Kersting et al. (2020), column 3, we see that the discrepancy in the second stage results stem from the use of different IVs. These different results need an explanation. One possibility is that the instrumental variable used by BW may violate the exclusion restriction because the IV is highly correlated with German share as discussed in section HYPOTHESIS, DATA, AND EMPIRICAL STRATEGY in Kersting et al. (2020). Hence, BW probably overestimate the effect of Protestantism on literacy due to their choice of instrument. Distance to Wittenberg does not isolate the effect of Protestantism because it captures both, the effect of Protestantism and that of ethnicity. Instead, the IV based on the idiosyncratic part of a rulers’ choice to become Protestant in the 17th century is less likely to suffer from such a violation of the exclusion restriction. The main reason is that this instrument controls for distance to Wittenberg and latitude, which should capture among other things also variation in ethnic heterogeneity. We have also tested for this formally following Conley et al. (2012) and Karadja and Prawitz (2019), see section HYPOTHESIS, DATA, AND EMPIRICAL STRATEGY in Kersting et al. (2020). In the context of abating religious tensions and growing ethnic conflict at the end of the nineteenth-century, this is crucial.

Second, we provide a mediation analysis on literacy rates, income and Protestantism. We rely on a new approach for a causal mediation analysis put forward by Dippel et al.

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<sup>1</sup>Note that Becker and Woessmann (2009, p.549) mention the cross-table but do not provide an analysis based on this cross-table.

(2018) and use STATA code by Dippel et al. (2020). This methodology allows us to calculate the share of the total effect of Protestantism on economic outcomes that can be attributed to higher literacy among Protestants. BW show that higher income tax per capita for Protestant regions is due to higher literacy as crucial mediating factor. We replicate this finding by relying on the IV mediation analysis put forward by Dippel et al. (2018). If we use the IV from BW in column 3 in Table A.5, we find that indeed about 90% of the overall effect of Protestantism on income tax per capita is due to literacy. If instead we use our preferred IV as described above the results change: income tax per capita is no longer significantly related to Protestantism and literacy is no longer a crucial mediating factor (columns 1 and 2 in Table A.5). This is an example that the context can be essential for econometrics: because the geography of ethnic differences overlaps with that of religious differences, a simple distance-based instrument is likely to violate the exclusion restriction.

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