

Initial Endowments and Access to Finance: the Role of Neolithic Transformation



Wenxuan Hou, Ruoran Zhao

University of Edinburgh Business School

wenxuan.hou@ed.ac.uk, ruoran.zhao@ed.ac.uk

Abstract

- We evaluate the influences of the timing of Neolithic transformation, when the hunter-gatherers became the first farmers, on contemporary financial development.
- We examine hypotheses using world-wide datasets at country-level, firm-level and household-level.
- Results show that early Neolithic transformation has endured positive influence on access to finance today via shaping the quality of legal institutions.
- The positive effects hold when we use regional high-resolution measures, and when we instrument Neolithic timing using six biogeography characteristics.

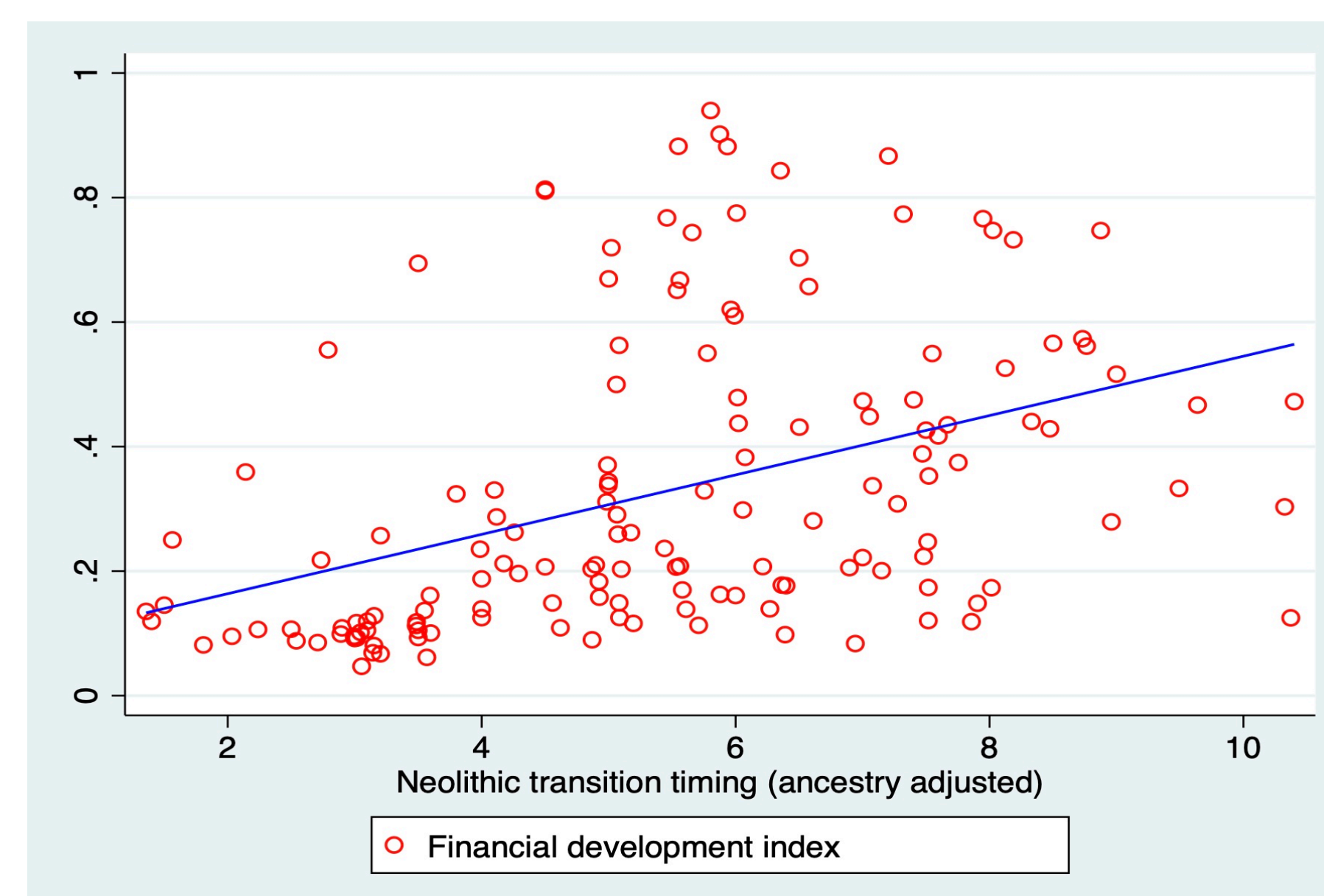
Motivation

- Do natural endowments in 10,000 BC matters for financial development today?
- Neolithic transformation provides a global setting to explore the historical root of divergency in financial development.
- Debates about Neolithic transformation in the economic literature suggest that this event could shape different institutions that exert opposite impacts (Borcan, Ola and Putterman, 2018; Bowles and Choi, 2019; Olsson and Paik, 2020).

Research Questions

- Does early Neolithic transformation benefit contemporary finance?
- If there is any influence, what is(are) the influencing channel(s)?

Pre-view a pilot result



Notes: This figure shows the scatter plot between Neolithic timing and the average value of Financial development index over 2000-2018.

Data

- Neolithic timing (Putterman, 2008): the number of thousand years elapsed, until the year 2000, since the population got more than half of their calories from cultivated foods and domesticated animals for their subsistence. Min, mean and max value are 1357, 5461, 10400 years.
- Financial development index (International Monetary Fund): a relative ranking of countries on the depth, access, and efficiency of their financial institutions and financial markets.
- Firms' access to finance (World Bank Enterprise Survey 2006 - 2019): an expansive array of economic data on 158,000 firms in 144 countries.
- Households' access to finance (World Bank's Financial Inclusion Database 2017): covers 150,000 adults age 15 and above in over 140 economies.
- Institutional quality: World Bank's Worldwide Governance Indicators measure modern institutions, while Ethnographic Atlas measure pre-industrial institutions.

Financial development across countries

$$FDevelopment_c = \alpha + \beta Neolithic\ Timing_C + X_C' M + \epsilon_c$$

	(1) Financial Development	(2)	(3) Financial Institutions	(4)	(5) Financial Markets	(6)
Neolithic timing	0.039*** (4.077)	0.037*** (3.968)	0.027*** (3.490)	0.025*** (3.285)	0.050*** (4.003)	0.051*** (4.208)
Population in 1500	0.011 (1.108)	0.017 (1.578)	-0.001 (-0.147)	0.006 (0.751)	0.023* (1.702)	0.029** (2.053)
GDP growth	-0.031*** (-2.963)	-0.030*** (-2.773)	-0.031*** (-3.690)	-0.030*** (-3.556)	-0.033** (-2.374)	-0.029** (-2.027)
Arable land (%)		-0.001 (-0.064)		-0.011 (-0.817)		0.006 (0.350)
Soil suitability		-0.140** (-2.422)		-0.055 (-1.054)		-0.222*** (-3.090)
_cons	-0.241 (-1.034)	-0.363 (-1.652)	0.099 (0.518)	0.000 (0.002)	-0.541* (-1.811)	-0.740*** (-2.629)
Obs.	146	139	146	139	141	134
R-squared	0.539	0.574	0.589	0.596	0.463	0.523
r2_a	0.501	0.530	0.555	0.554	0.417	0.471
Religions	Yes	Yes	Yes	Yes	Yes	Yes
Legal origins	Yes	Yes	Yes	Yes	Yes	Yes
Geography	Yes	Yes	Yes	Yes	Yes	Yes

T-values are in parenthesis
*** p<0.01, ** p<0.05, * p<0.1

- Results show that early transition has positive relation with financial development. Based on column 2, one thousand years early transition explains 0.037 higher index (11.2% of mean value).

Households' access to finance

- Early transition has positive relation with whether an individual has an account, debit card, credit card in financial institutions, whether be able to raise emergency funds and use Internet pay.
- We have controlled people's education, employment, incomes, gender and age.

Firms' access to finance

	(1) Financial obstacle (in 100%)	(2)
Neolithic timing	-2.835*** (-5.096)	-3.157*** (-5.751)
Neolithic timing *Dependence		-0.091*** (-10.155)
Firm size	-0.002*** (-4.243)	-0.001** (-2.259)
Firm age	-0.076*** (-3.749)	-0.041** (-2.052)
Manager experience	-0.009 (-0.313)	-0.000 (-0.014)
Female manager	-0.397 (-0.504)	-1.037 (-1.305)
Foreign ownership	-0.105*** (-10.979)	-0.086*** (-9.093)
State ownership	-0.060* (-1.970)	-0.029 (-0.981)
_cons	1954.742*** (4.738)	1971.428*** (4.795)
Obs.	139759	139759
R-squared	0.051	0.055
r2_a	0.051	0.055
Sector FE	Yes	Yes
Country controls	Yes	Yes
Year of survey	Yes	Yes

T-values are in parenthesis
*** p<0.01, ** p<0.05, * p<0.1

- Results show that early transformation is associated with fewer financial obstacles faced by firms, and for industries which more rely on external finance, the effect is larger.
- Access to finance further influences firms' R&D spending, innovation and providing new products/ services (table not shown).

Influencing channel(s)

- Better state capacity in year 1500

(1)	(2)	(3)	(4)
Hierarchy complexity	Intensive irrigation	State history	Property rights
0.026*** (2.729)	0.061*** (4.298)	0.051*** (14.732)	0.010 (1.333)

- Better legal institutions today

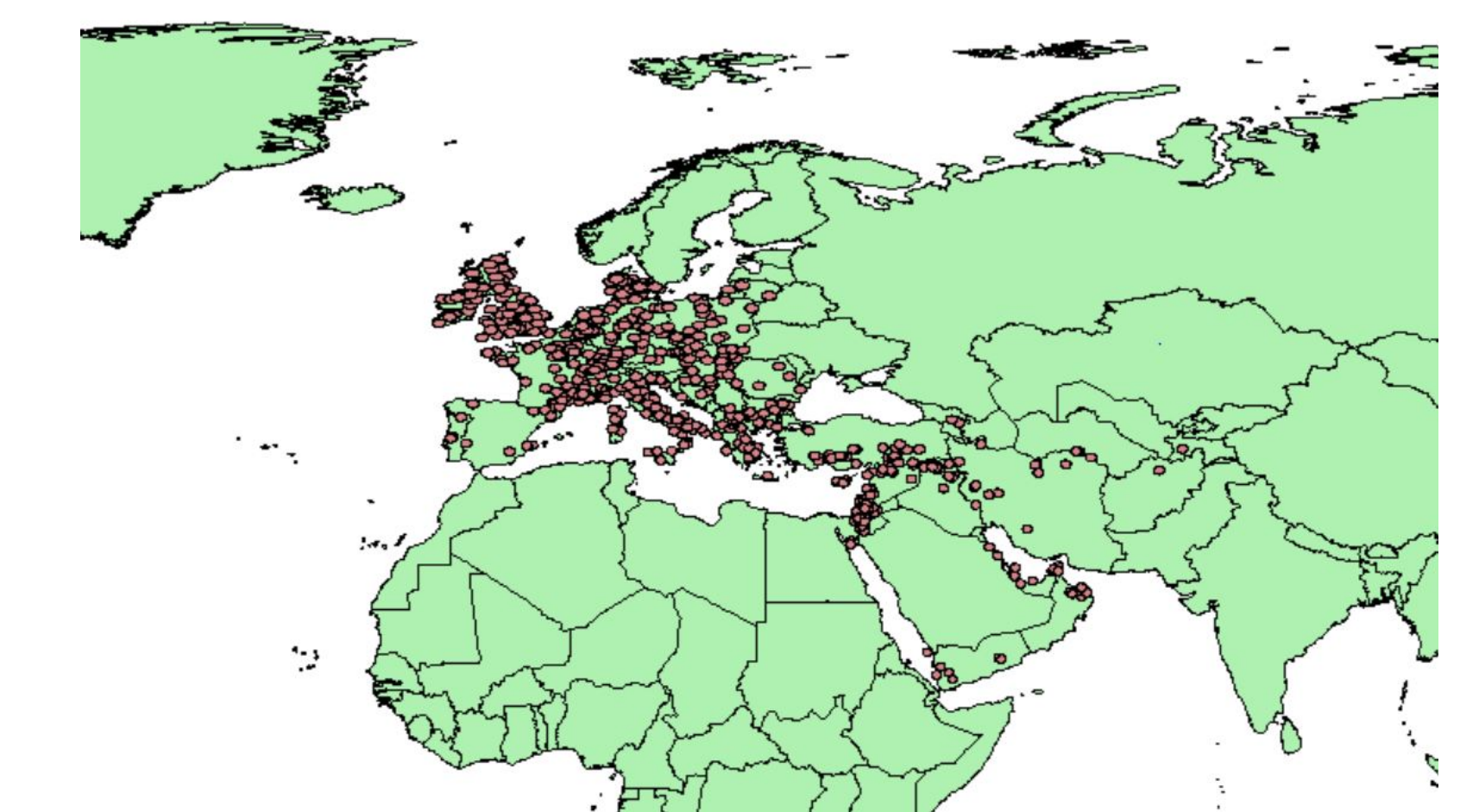
(1)	(2)	(3)	(4)	(5)
Government effectiveness	Regulatory quality	Rule of law	Control of corruption	Property rights
0.103** (2.503)	0.082* (1.965)	0.076* (1.811)	0.073* (1.725)	1.706** (2.261)

- Less severe corruption issue (firm-level evidence)

(1)	(2)	(3)	(4)	(5)
Gift - government contracts	Gift value (% of contract)	Gift - water connection	Gift - construction permits	Gift - import license
-1.460* (-1.901)	-0.311*** (-3.371)	-1.460** (-2.168)	-1.612** (-2.230)	-1.561* (-1.976)

Robustness

- Regional level analysis: geo-coded firms' data is combined with alternative transition timing data of 750 sites (Pinhasi, Fort and Ammerman, 2005).



	(1)	(2)	(3)	(4)
	Financial Obstacle			
Neolithic timing	-0.074** (-2.069)	-0.096** (-2.224)	-0.099** (-2.297)	-0.088** (-2.054)
Neolithic timing *Dependence				-0.002** (-2.427)
_cons	73.657*** (2.627)	78.809*** (2.629)	87.503*** (2.696)	85.856*** (2.667)
Obs.	10337	9869	9866	9866
R-squared	0.156	0.156	0.171	0.172
r2_a	0.153	0.152	0.158	0.158
Firm characteristics	Yes	Yes	Yes	Yes
Regional geography	Yes	Yes	Yes	Yes
Regional economy	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes
Country-Industry FE	No	No	Yes	Yes

T-values are in parenthesis
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- IV method: to address potential issues of measurement error and endogeneity, we predict Neolithic timing using climate suitability, latitude, longitude, continent size, the number of domesticable plants and animals available in 10,000 BCE.

Contributions

- We add to finance literature by identifying the timing of Neolithic transition as a long-lasting determinant and emphasizing the importance of legal institution (La Porta, Florencio, Shleifer and Robert, 1998; Acemoglu, Johnson and Robinson, 2001; Levine, Lin and Xie, 2020).
- Our work relates to debates about long run impacts of the agriculture (Alesina, Giuliano and Nunn, 2013; Olsson and Paik, 2020).
- We provide implications for contemporary financial development by learning from history.