Title: Long-Term Persistence
Author(s): Luigi Guiso, Paola Sapienza, Luigi Zingales
Journal: NBER Working Papers
Year: June 2014

Hypothesis & Relevant Questions:

- Can historical shocks generate long-term persistence in development by fostering a better culture?
- Why are differences in economic development so persistent?
- Does culture persist only when it is optimal or does it tend to outlive its usefulness and the environment that generated it?
- GSZ revisit the Putnam hypothesis and study civic capital differences across Italian regions caused by incidence of free city states (Communes) in the Middle Ages
  - Considers institutions which are long gone →culture effect only
  - Exploits regional variation in Center-North
  - Considers span of several centuries, while effects last until today!
- Also consider:
  - Did the length of independence affect the level of civic capital today
  - Those free cities which evolved into "Signorie"
  - Variation in quality and degree of autonomy of the free institutions
- Hypothesis: If the regional differences in civic culture are due to the free state experience (see Putnam), the civic capital today should be:
  - Higher in cities that were free states in the Middle Ages
  - Difference should be more pronounced the longer the independence lasted

Area of Research & Relevant Previous Literature & Historical Background:

- AJR (2001) focus on the LR effects of formal institutions in explaining the economic differences we see today – contract rights; property rights; constraints on the executive. However, the hypothesis has several weaknesses:
  - How do you differentiate between the legal institutions from the culture & human capital the colonizers brought?
  - Why should institutions be so persistent anyway? They are designed to be changeable!
  - Can we really disregard the impact of geographic factors?
- Alternative Hypothesis: Putnam et al (1993); Williamson (2000)
  - Persistence of economic development attributable to culture
  - Culture is the most persistent of all institutions!
  - However, these provide very little in the concrete mechanisms of persistence!
- Growing literature on the persistence of cultural attitudes over long periods of time:
  - Nunn & Wanchekon (2011): slave trade on Africa's level of trust today
  - Voigtlander & Voth (2012): correlation between German anti-Semitism in 1350 and 20th century
  - Grosjean (2011): studies a culture of violence functional to a pastoral society
  - Alesina et al (2013): studies diffusion of the flow in agriculture (gave comparative adv. to men over women)

- Focus on Civic Capital:
  - "Those persistent and shared beliefs and values that help a group overcome the free rider problem in the pursuit of socially valuable activities"
- As the Holy Roman Empire was disintegration at the end of the 1st millennium, a number of independent city states emerged in Center-North Italy
  - Pre-eminent common interest was defense against the Emperor's attempt to exert power over the city → culminated in 1176 when a league of free cities (Lombard League) defeated Emperor Frederick I @ the Battle of Legnano
  - These communes created their own rules, lows, and formal decisions in the name of the people; courts of law; primitive rule of law existed!
- In the 15th c. communes became Signoria, under the rule of a single ruler; however, in some cases, this ruler retained the fundamental institutions of the commune → additional source of variation in civic culture.

Data Used & Its Sources:
- Sample: 5,372 cities of Center-North; 2,175 cities from South Italy
- Focus on independence of communes at two points in time:
  - 1176: when northern communes organized into Lombard League
  - 1300: height of free city movement before emergence of Signoria
- NB: "For an outcome-based measure to qualify as a reliable indicator of civic capital, the relationship between the input (civic capital0 and the measured output should be stable and not affected by other factors, such as legal enforcement" (8)
- Measures of Civic Capital (Dependent Variable):
  - Town's number of non-profit organizations in 2000; follows argumentation of Putnam et al (1993); data from 2001 census
  - Indicator for the existence in the town of an organ donation association (data from AVIS)
  - Estimated probability than an observed score is due on a national math test is due to cheating (data from INVALSI)
- Additional historical variables:
  - City size for 1300 CE (from Bairoch (1988))
  - Whether town was colony of ancient Rome; whether located at a Roman crossroad
  - Presence of a bishop seat; presence of a marquis
- Other Variables; geographic controls, income, population → from Ancitel database (2014)

Methodology: '
- Use Weighted Least Squares Method, weighted by the population in 2001
  - This is done because measures of civic capital tend to be noisier for smaller towns
- Basic Specification: Regress number of non-profit organizations divided by the 2001 population on an indicator of whether town was a free city in 1176
  - Controls: geographic controls; income inequality; population and population^2; income per capita today; area dummies (for unobserved heterogeneity)
  - Same regression using two alternative dependent variables for civic capital

- Note that all free city experiences are not similar
  - Length of independence varied
  - Town's history after the end of the free city differed
  - Quality and degree of autonomy of free institutions differed
- Use local presence of a bishop to isolate the effect of the duration of independence (assuming that the bishop affects only the probability of becoming a free city state and its ability to remain independent); use a two-step Heckman estimator (13)
- Study the effect of having become a Signoria after being a free commune
- Finally, study the strength of a free city's independence
  - Proxy for this is whether the city was against Emperor Frederick (i.e. part of Lombard league), neutral, or allied with him in 1158
- Although the presence of a group of controls mitigate some concern of spurious effect, we cannot be 100% sure that the free city experience is not correlated with some unobserved characteristics (other than cultural)
  - GSZ design a counterfactual based on the fact that the Norman Kingdom in the South did not allow for the formation of free cities
  - If some unobserved characteristics are the true cause of higher civic capital, these characteristics should have the same correlation with civic capital in the South!
  - Use presence of a bishop in 1000 as a proxy for ease of coordination and creation of communes in Italy; test effect of presence of bishop on civic capital today in North-Center vs. South

Results:
- Not only the establishment of but also the duration and degree of independence of the historical free city states affect today's civic capital positively
  - Duration of independence has a positive and statistically significant effect
  - Having experiences a period of Signoria adds to the level of civic capital
  - Strength of independence also has a positive effect on civic capital
- "While the free city state is not a random occurrence, the initial characteristics that facilitated independence are linked to higher civic capital only through the transformative city state experience. In other regions in Italy, where the same initial conditions existed (i.e. presence of a bishop) but could not deliver free city states, or in subsequent periods where the initial conditions could not spur independence, we do not find a positive correlation with civic capital" (16)

Conclusions:
- This paper highlights the cultural persistence of attitudes that are passed from generation to generation
- Although the paper does not explore the particular transmission mechanisms, several hypothesis have been suggested:
  - Participation in public life trains people to cooperate and this is transmitted through generations (Putnam 2000; Olstrom 1990)
  - Transparent & democratic institutions affect citizens' beliefs about trustworthiness and fairness (Tabellini 2008; Rothstein 2011)

- Historical events affect a nation's psyche – changing attitudes through a socialization process (Banfield 1958)

Comments & *Additional Notes*:

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Title: The Long-Term Effects of Africa's Slave Trades
Author(s): Nathan Nunn
Journal: Quarterly Journal of Economics
Year: 2008

Hypothesis & Relevant Questions:
- Can part of Africa's current underdevelopment be explained by its slaves trades?
  - After all, slave trade lasted much longer than colonialism in Africa!
- What channels of causality underlie the relationship between slave exports and subsequent economic development?

Area of Research & Relevant Previous Literature & Historical Background:
- Africa's underdevelopment is characterized by two events: slave trade and colonialism
- Between 1400 and 1900, Africa simultaneously experienced four slave trades
  - Trans-Atlantic; trans-Saharan; Red Sea; Indian Ocean slave trades
- Findings complements research of Engerman & Sokoloff (1997, 2000, 2002) who show that slavery resulted in the evolution of institutions not conducive to economic growth
- These four slave trades are distinct for several reasons:
  - The sheer volume of slaves exported is unprecedented! Trans-Atlantic ~12m
  - Individuals of same or similar ethnicities enslaved on another → severe negative consequences for state development
- Some of the most detrimental impacts of slave trade on African development:
  - Ethnic fractionalization; absence of large communities; low social cohesion; reduces provision of public goods
  - Conflict between and within communities; "gun-slave cycle"; Europeans promoted internal instability and conflict; political instability
  - Legal institutions weakened; abuse of the judicial system;
  - Persistence of inefficient equilibria → high levels of predation and low production
  - Positive Effects??? Consolidating strong networks of exchange and credit; introduction of high yielding varieties of crops

Data Used & Its Sources:
- Estimates of slave exports are constructed using two sets of data:
  - Shipping data from Trans-Atlantic Slave Trade Database → total number of slaves exported from each port/region in Africa
  - To calculate proportion of slaves shipping from the coast that came from inland countries, Nunn uses a 2nd source on ethnicity identity of slaves
    - Using ethnicity data, he constructs the ratio of slaves from each coastal country relative to the landlocked countries to the interior
- Of course, the data is imperfect and subject to several measurement error issues:
  - Ethnicity is likely to contain significant measurement error
  - Slaves from interior are likely to be under-represented in the ethnicity sample
  - Two ways to deal with the measurement error: (i) Nunn shows that for the second issue, the error will cause downward bias in the estimates; (ii) use instrumental variales

- Finally, we have daa on the number of slaves shipped from each country during each slave trade and during four periods of time:
  - 1400-1599; 1600-1699; 1700-1799; 1800-1900
  - Estimates are consistent with what historians believe were the primary slaving areas

Methodology: ‘

- Start off with the basic OLS regression:

  $$\ln y_i = \beta_0 + \beta_1 \ln(\text{exports}_i) + \beta_2 \ln size_i + \text{K}_i^{'}\delta + \varepsilon_i$$

  - Regress GDP pc in 2000 on total number of slaves exported between 1400-1900, country size, vector of dummies for origin of colonizer prior to independence
- Also uses average annual pc GDP growth between 1950-2000 as the dependent variable
- The key variable of interest here is the log of exports; a useful alternative is slave exports normalized by land area
- Nevertheless, it remains unclear whether the slave trades had a causal effect on current income; it could have been that initially poor institutions were somehow selected into slavery! Nunn has three strategies to evaluate the causal effect:
  - Use historical evidence to evaluate the characteristics of selection into slave trade
  - Use an instrumental variable approach
  - Control for observable country characteristics
- The first approach is to use historical evidence:
  - In fact, when Europeans began to demand slaves, it was those countries that were most developed, densely populated, that were selected into slavery!
  - Data confirms this → most densely populated areas in 1400 contributed the most to the slave trades
  - A second selection bias is if countries that already had domestic slavery were those selected into it; evidence suggests that is not the case
- The second approach is an instrumental variable technique:
  - Could correct for the unobserved influences and for the measurement error
  - First Instrument: distance from each country to the location of where slaves were demanded
    - Assume that the location of supply did not influence the location of demand!
    - Conceptually, the instruments measure the distance from the interior of each country to the most important destinations in each of the four slave trades (both overland and sailing distances considered)
    - NB: There is a serious concern that the distance to the coast is correlated with the error term in the 2nd stage! (e.g. landlocked countries develop more slowly!)
      - This is true, but this potential correlation will only bias the IV estimate towards zero → we can take it as a lower bound
  - Second Instrumental Variable: Use Initial population density as the IV
    - Although the instrument most probably does not satisfy the exclusion restriction, again Nunn shows that the estimate will be biased towards zero

- Finally, the third strategy is to control for additional country characteristics that might affect income per capita and therefore OLS
  - Region fixed effects; controls for physical environment, natural resource endowments, culture, religion
- Having substantial evidence that slave trade had a causal effect on economic development, Nunn now examines potential transmission mechanisms
  - Most likely ones: through state development, ethnic fractionalization, quality of domestic legal institutions!
  - Here, Nunn continues to use distance from each country to the location of demand as a instrumental variable on exported slaves
- First, Nunn tests whether slave exports are correlated with level of domestic state development after the slave trades, but prior to colonial rule
  - Data: measure of indigenous political complexity of ethnic groups from Gennaioli & Rainer (2005)
- Secondly, Nunn considers relationship between slave exports and current domestic legal institutions
  - Data: Index of each country's rule of law in 2000 from Kaufmann et al (2003)
- Next, Nunn considers slave trade's impact on ethnic and social fractionalization
  - Data: measure of ethnic fractionalization from Easterly & Levin (1997); measure of cultural diversity from Fearon (2003)
- Finally, he considers relationship between slave exports and income pc in 1950
  - Weak influence is a crucial result, because at that time most of these countries were still under colonial rule, and institutions were externally imposed
  - "If the slave trades affect income through the development of domestic institutions and policies, then we would expect the relationship between the slave trades and income to be much weaker, or even non-existent, when a country's institutions and policies are determined externally by a colonial power. The weak relationship between slave exports and 1950 income is consistent with this." (37)
- Nunn finally shows that the importance of slave exports is primarily driven by the trans-Atlantic slave trade, and it is robust to using the most precise data

Results & Conclusions:

- There is a robust negative relationship between the number of slaves taken from a country and its subsequent economic development
- Finds supports for the view that the slave trades resulted in weak, politically fragmented states, ethnic fractionalization and poor judicial institutions

Comments & Additional Notes:

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Title: Was Weber Wrong? A Human Capital Theory of Protestant Economic History
Author(s): Sascha Becker & Ludger Woessmann
Journal: Quarterly Journal of Economics
Year: 2009

Hypothesis & Relevant Questions:

- Hypothesis: "Protestant economies prospered because instruction in reading the Bible generated the human capital crucial to economic prosperity"
  - Martin Luther promoted universal literacy → this was also beneficial in economic activities

Area of Research & Relevant Previous Literature Historical Background:

- Max Weber suggested in *The Protestant Ethic and the Spirit of Capitalism* that a "Protestant ethic" was key for economic progress → Weber's Theory
  - Potential Mechanisms: working harder; saving more → investment
- Prussia had uniform laws & institutions at the time → no institutional heterogeneity
- Broadly related to the literature exploring religion and economic outcome
  - Guiso, Sapienza, Zingales (2006): religion as a fundamental determinant
  - Barro & McCleary (2003,2005): study religions and economic growth
- Of course, we know that AJR (2001, 2005) find no effect of religion on growth
  - But, these studies are plagued by the unobserved heterogeneity!
- The B&W theory of human capital is largely complementary to Weber's theory
- 95 Theses of Luther – the catalyst for Protestantism – posted in 1517
- The first part of Weber's theory – that Protestantism is correlated with higher economic prosperity – can be confirmed with the data
- Luther addressed his educational demands in 2 addresses
  - Duty of rulers to maintain schools → costs of schooling may have been lower
  - All Christians are to ensure their children are educated → benefits of literary higher!
- A simple economic model would predict that to maximize utility, Protestants will have more education than Catholics because of lower costs and highe benefits
- Finally, B&W argue that education was useful beyond religion
  - Theory of human capital from the 1960s → it is an investment that increases productivity!
- Prussia is the obvious place to test association between Protestantism and education
  - Birthplace of the Reformation; 95 Theses
  - Max Weber's birthplace; he had profound observations on the region
  - Uniform laws and institutions
  - Well-divided between Protestants and Catholics; freedom of religion
  - One of the largest countries in 1871 – 24.6 million
  - Very high quality data at the county level is available

Data Used & Its Sources:

- Include 1870/1880s county level data for Prussia
- Best proxy for county income level is income tax revenues in 1877
  - Alternative: sectoral structure of the 452 counties in 1882 (services, manufacturing)
- Prussian Statistical Office collected impressive data; first data on literary of whole population was the 1871 Population Census
- First, use cross-country data to confirm patterns between Protestantism and education; use data on literacy rates in 1900 mainly from UNESCO (1953)
- Key Source: 1871 Census; 452 counties, 35 districts, 11 provinces
  - Religious affiliation; literacy; demographic variables
  - NB: Looking at the geographic distribution of religious affiliation, one notices a mostly concentric pattern with Wittenberg at the center
- 1886 Education Census
  - Useful proxy for supply of schools → did you have a school <3km away

Methodology: ‘

- Approximately concentric diffusion of Protestantism in Prussia around Wittenberg…exogenous variation in Protestantism in the late 19th c.
- The basic function form is the following:
  $LIT = \alpha_1 + \beta_1 PROT + X\gamma_1 + \varepsilon_1$
  - Controls: share of Jews; females; age distribution; average household size, population growth
- Some robustness checks on the association between Protestantism and literacy
  - Geographical control variables; proxy for Slavic languages; fraction working in mining; fraction living in urban municipalities; year in which a country became Prussian; Free imperial and Hanseatic cities; account for nonrandom variation; using distance to school as an alternative measure of human capital
- B&W next address the potential issue of endogeneity in Protestantism
  - Could be an issue if unobservables related to a count being Protestant are also related to literacy and economic development
  - B&W argue that Reformation in Prussia can be viewed as an exogenous event
    - Regional variation had already existed in late 19th c.
    - Citizens forced to accept denominational choice of sovereigns →little room for religious denomination being endogenous to literacy at the time!
    - Nevertheless, other potential selection bias sources do exist → we really need an instrumental variable to control for these!
  - B&W use a credibly exogenous instrumental variable → distance from Wittenberg
    - Takes account of concentric dispersion of Protestantism around Wittenberg
    - Main reason was the cost of travelling and information diffusion; dialects
  - B&W next tackle to question – is distance from Wittenberg a valid instrument – using a set of tests!
    - Distance is insignificant to the probability of a city being a free imperial city
    - Same thing can be said about being a Free Hanseatic city
    - Extent of urbanization before Reformation is unrelated to the distance

    - Distance is completely unrelated to the spread of unis in pre-Lutheran times
    - Not related to the existence of a school in a country before 1517
  - However, all the above indicators are correlated with our measure of literacy in the late 19th c. → B&W's instrument must indeed be exogenous
- Having established the association between Protestantism and better education, B&W examine the importance of education for higher economic prosperity
  - Main measure of economic outcome is income tax revenue (available for 1877)
  - Alternative measure: salary of teachers in the county (from 1886 Census)
  - Alternative measure: sectoral structure (1882 Occupation Census) → looking at manufacturing/services vs. agricultural sector
- The functional form for Protestantism and economic outcomes posited is:

  $Y = \alpha_2 + \beta_2 PROT + X\gamma_2 + \varepsilon_2$
- B&W's main theory is that Protestantism affected economic outcome largely via human capital accumulation
  - Next consider the extent to which the causal effect of Protestantism on literacy can account for the association between Protestantism and economic variables
  - One approach is to test the following:

  $Y = \alpha_3 + \beta_3 PROT + \chi_3 LIT + X\gamma_3 + \varepsilon_3$
    - However, both literary and Protestantism may be endogenous here, we B&W have no independent instrument for literacy available
  - B&W therefore restrict the effect of literary to levels consistent with evidence found in other studies, as such:

  $-\bar{\chi} LIT = \alpha_4 + \beta_4 PROT + X\gamma_4 + \varepsilon_4$
    - This strategy allows B&W to obtain estimates of the effect of Protestantism (instrumented) on economic outcomes net of the literacy effect
    - B&W continue by testing the equation above for a large range of $\bar{\chi}$ values
    - Results generally point to very small effects of Protestantism after adjustment for literacy differences!
- Given that Protestantism does not have an impact on economic outcomes independent of its effect on literary, B&W estimate the following system of 3 equations:

  $Y = \alpha_4 + \beta_4 LIT + X\gamma_4 + \varepsilon_4$

  $LIT = \alpha_5 + \beta_5 PROT + X\gamma_5 + \varepsilon_5$

  $PROT = \alpha_6 + \beta_6 WITT + X\gamma_6 + \varepsilon_6$
  - The above model accentuates the 3-stage character of B&W's main argument and provides an estimate of the economic return to literacy (3SLS)
  - Results are completely in support of previous finding

Results:
- Cross-Country: Among countries where Protestantism & Catholicism accounted for the majority of the population → those with Protestant majorities had almost 100% literacy!
- Initial regression reveals there is strong positive association between literacy and share of Protestants in a county

    - Multivariate specification → association becomes even larger!
- Estimated association between Protestantism and literacy is barely affected by the robustness checks
- IV Estimation:
    - Estimate the equation above, but instrumenting Protestantism with distance
    - First stage → instrument is strong; second stage → positive effect of Protestantism is highly robust to the IV specification
- Counties with larger shares of Protestants exhibit an advanced degree of economic progressiveness, consistently across the different economic measures
- Based on OLS estimates of the literacy effect Protestants' higher literacy can account for roughly the whole gap in economic outcomes between the two denomination
- Finally, B&W look at contemporary Germany (data from German Socio-Economic Panel)
    - Protestants have on average 5.4% higher incomes and 0.8 years more education than Catholics
    - However, when B&W adjust for the effects of education, the income differences disappear!

Conclusions:
- So, was Weber wrong?
    - He was right in the observation that Protestant regions were economically more affluent
    - He was more likely wrong about the channel through which this pattern arises → appears to be as a result of higher literacy and educational attainment
    - Could the human capital be complementary to the "Protestant ethic"? Difficult to say, and no correct answer.
- The link between cultural factors and economic development may be very strong indeed!

Comments & *Additional Notes*:

Title: Unbundling Institutions
Author(s): Daron Acemoglu & Simon Johnson
Journal: Journal of Political Economy
Year: 2005

Hypothesis & Relevant Questions:

- What is the relative importance of 'property rights institutions' and 'contracting institutions' in determining various indicators of economic development?
- Does the insight that property rights issues are much more difficult to deal with compared to contract issues mean that the former are more important?

Area of Research & Relevant Previous Literature Historical Background:

- Douglass North (1981) distinguished between:
  - 'Contract theory' of the state (i.e. legal framework for economic transactions)
  - 'Predatory theory' of the state (i.e. state as an instrument for transferring resources)
  - Emphasizes the need for both good contract laws and protection from expropriation
- What are institutions?
  - The social, economic, legal, and political organization of a society
- Literature emphasizing the contract theory:
  - Coase (1937; 1960), Williamson (1975, 1985), Grossman & Hart (1986), Hart & Moore (1990), Hart (1995)
- Literature emphasizing protection from gov't:
  - Jones (1981), De Long & Shleifer (1993), Olson (2000)
- Other related literature:
  - Djankov et. al. (2002, 2003), La Porta et. al. (1997, 1998), Beck et. al. (2003), Rajan & Zingales (2003)
- Although there is much overlap between different types of institutions, there are important differences. Most importantly, contract institutions determine interactions between citizens while property rights institutions involve the interaction between citizens & the state
  - **Problems with contracts can be amended! Problems with property rights cannot!**

Data Used & Its Sources:

- Contracting Institutions → rules and regulations governing contracts between ordinary citizens; legal system; proxied with three measures
  - Index of legal formalism (from Djankov et al. (2003)); higher formalism → higher costs
  - Index of overall procedural complexity in resolving a case involving nonpayment of commercial debt (from World Bank (2004))
  - Number of distinct procedures involved in the above process (again, WB (2004)
- Property Rights Institutions → rules and regulations protecting citizens against the power of the government and elites; also proxied with three variables:
  - Constraints on Executive (from Polity IV data)
  - "Protection against expropriation" by government (from Political Risk Services)
  - Private Property Index (Heritage Foundation)

- Use four different outcome variables (i.e. DVs); data from the 1990s
  - Level of GDP per capita
  - Ratio of investment to GDP
  - Private credit as a % of GDP
  - Stock market capitalization

Methodology: ‘

- The basic econometric specification used here is:

  $Y_i = \alpha F_i + \beta I_i + \gamma_0 Z_i^{'} + \varepsilon_i$

  - In the above, F are contracting institutions; I are property rights institutions, and Z is a vector of other controls. Naturally, we are interested in alpha & beta!
- The first empirical strategy is to estimate the above with OLS; serious limitations:
  - Institutional variables both endogenous; reverse causality; omitted relevant variables
  - Measurement error in the institutional variables; attenuation bias; correlated!
  - As a result, AJ cannot interpret the results from OLS as causal!
- The second econometric strategy used is two-stage least squares (2SLS)
  - AJ use distinct and plausible instruments for both contracting institutions (CIs) and property rights institutions (PRIs)
  - Of course, the instruments must be correlated with the endogenous variables but orthogonal to any other omitted characteristics
  - Proposed Instruments for PRIs: (log) mortality of European settlers in colonies (see AJR (2001); log indigenous population density in 1500 (see AJR (2002))
  - Proposed Instrument for CIs: Whether or not the country was a British colony (i.e. British legal origin) (see La Porta et al. (1997, 1998)
- A potential concern is that English legal origin might be affecting economic & financial outcomes through channels other that legal formalism
  - AJ test this by instrumenting for PRIs but enter English legal origin in the 2nd stage
  - Fortunately the results are unsurprising. English legal origin has no significant positive effect in any specification, except on stock market capitalization
  - Therefore, we shouldn’t be worried about any other effect of English legal origin except that through CIs!
- Next, AJ perform several robustness checks by limiting the sample:
  - First, they look at common-law countries (i.e. British) and French legal origin countries separately, dropping the legal formalism variable
  - Second, the drop the four “neo-Europes” (i.e. Australia, Canada, New Zealand, US)
  - Thirdly, they limit the sample to only countries above median world income
  - In all of these sample limitations, the main results shown below remain intact!
- Next, AJ add several control variables:
  - Religion, Latitude, Macroeconomic Outcomes
  - However, the results on the main institutional variables remain the same!
  - In addition, once AJ control for CIs and PRIs, religion and geography have no significant effect on income per capita

- Finally, AJ ask whether the proxies for CIs and PRIs really capture features associated with contractual and property rights institutions
  - To do this, they use the World Bank's WBES, firm-level survey covering 80 countries and asking managers about various legal, economic, political impediments to business
  - For CIs, AJ look at 3 variables: quality of courts; functioning of the judiciary; violation of intellectual property
  - Regressing each of these variables on constraints on the executive and legal formalism, AJ find that the latter has a significant impact while the former does not. In effect, AJ conclude that their proxy for CIs is indeed valid
  - For PRIs, AJ look at 3 variables: "additional payments" paid to gov't; assessment of gov't corruption; predictability of legislation & regulation
  - Here, AJ find that their instruments and proxies for PRIs are significant determinants while the proxies for CIs are not

Results:

- AJ begin with univariate specification of each of the outcome variables on the various proxies for CIs and PRIs (separately)
  - There are strong effects of PRIs on GDP pc, investment, credit, and stock market development in both univariate OLS and IV regressions
  - Strong effects of CIs on credit and stock market development, with limited effects on GDP pc and investment-GDP ratios
- Next, AJ run the first-stages from the 2SLS approach. They regress the various institutional proxies on the three instruments of interest
  - English legal origin has a large and negative effect on the proxies for CIs (which means English legal origin was more efficient), but no effect on proxies for PRIs
  - Settler mortality and population density have large and significant (negative) effects on proxies for PRIs but no discernible effect on proxies for CIs
  - This gives very significant credence to the IV strategy employed by AJ!
- Next, AJ present their main results. For each of the dependent variables, they present regression with different combinations of proxies for both PRIs and CIs (one of each). Additionally, they present both IV results and equivalent OLS results (for comparison)
  - For GDP pc, the IV results tell us that once we account for PRIs (significant!), there is no evidence that CIs have any significant effect on LR economic performance!
  - For investment/GDP, the IV results show a robust positive effect of PRIs and no evidence that CIs affect investment
  - For credit to the private sector, IV results show a strong effect of PRIs, while CIs do not appear to be a significant determinant of credit
  - Finally, when we look at stock market capitalization, we find a significant effect of both PRIs and CIs!

Conclusions:

- Although AJ provide robust evidence the PRIs are a significant determinant for economic development, the exact mechanisms through which they work is still very much unknown!

Comments & *Additional Notes*:

Title: Reversal of Fortune
Author(s): Daron Acemoglu, Simon Johnson, James Robinson
Journal: The Quarterly Journal of Economics
Year: 2002

Hypothesis & Relevant Questions:
- The paper documents a reversal in relative incomes among the former European colonies
  - In particular, for these colonies, those that were relatively rich in 1500 are now poor!
- Why did this reversal take place? When did it take place?
- AJR believe it reflects an "institutional reversal" due to the observation that Europeans were more likely to introduce inclusive institutions in regions that were previously poor
- The paper emphasizes the influence of population density and prosperity on the policies pursued by the Europeans (as opposed to settler mortality as in AJR (2001))

Area of Research & Relevant Previous Literature Historical Background:
- AJR begin with a robust negative association between economic prosperity in 1500 & today
- There are several competing theories that try to explain LR determinants of development:
  - "Geography Hypothesis" → Machiavelli (1519), Montesquieu (1748), Marshall (1890), Myrdal (1968), Diamond (1997), Sachs (2000, 2001)
    - There are both simple and sophisticated geography hypotheses, which AJR examine
    - AJR find little evidence in support of either version of the hypothesis!
  - "Institutions Hypothesis" → differences in economic prosperity mainly due to differences in the organization of society
    - Relevant research: North & Thomas (1973), North & Weingast (1989), Olson (2000)
    - AJR focus on property rights institutions (PRIs) – these can be both inclusive or extractive in nature
    - Extractive institutions may emerge as an equilibrium condition, unfortunately, because of the benefits that go to the ruling elite!
- Other related research: Coatsworth (1993), Engerman & Sokoloff (1997, 2000), AJR (2001)
- The main idea behind this is that European colonizers were profit-maximizers. When they arrived in a new territory, what was the best way to get profit from it?
  - If it was poor and sparsely populated, Europeans had to settle and develop institutions encouraging investment
  - If it was rich and prosperous already, it was easier to just take over existing institutions, impose forced labor and gain profit that way
- Additionally, AJR find significant evidence that societies with good institutions were able to take advantage of the Industrial Revolution in the 18th and 19th centuries!
- Importantly this reversal is consistent with historical observations about the development of various regions! (p. 1253)

Data Used & Its Sources:
- Two main measures for economic prosperity in 1500:
  - Urbanization (argued for by Bairoch (1988) and de Vries (1976))
    - Data mainly from Bairoch (1988) and Eggimann (1999)

- Population density (logical, due to Malthusian epoch, see Ashraf & Galor)
  - Data comes from the comprehensive research on population since 1AD from McEvedy and Jones (1978)
  - Population density calculated by dividing total population by arable land
  - The theoretical relationship between population density and income is more nuanced and must be treated with caution (see Malthus)
  - Even though there is definitely no association nowadays, it is likely to have been a good proxy for income around 1500!
- For income per capita today, AJR use log income per capita in 1995 (PPP)

Methodology:

- Firstly, AJR investigate whether urbanization is a good proxy for income?
  - Kuznets (1968) sees sustained increases in pc income as most often accompanied by increases in population and urbanization
  - After running several regressions and controlling with period and country dummies, the association between urbanization and income is robust and a good proxy
- The main regressions of the paper involve regressing income pc in 1995 on urbanization in 1500 and various controls
  - NB: The results do not simply suggest a mean reversion → it is a reversal! Relatively rich former colonies are now relatively poor!
  - Controls: exclude N. African countries, excludes Americas, continental dummies, drop the neo-Europes, distance from equator, additional geography variables and natural resources, identity of the colonial power
  - Also perform the same regression using different estimation techniques for urbanization
  - Next, AJR use population density in 1500 as the main independent variable and afterward instrument density in 1500 with density in 1000 to isolate the LR component of density differences across countries (results are very similar)
- Next, AJR address the very likely measurement error in estimates of urbanization and population density
  - Firstly, the attenuation bias caused by measurement error will bias the results toward zero (i.e. estimates will be lower bounds to the effect)
  - However, there may be a problem if the errors are not random, but correlated with current income in some systematic way
  - To deal with this, AJR report a variety of different estimates for urbanization and population density
  - Additionally, AJR note that in non-colonies, there is a positive relationship between urbanization in 1500 and income pc today! Reversal most likely due to colonialization!
  - The general pattern of reversal in relative incomes is unchanged!
- Having definitively argued for the reversal of fortune between 1500 and 1995 in former colonies, AJR next investigate the timing of this reversal
  - Graphs clearly indicate that the reversal is mostly a late 18th c. and early 19th c. phenomenon
  - For example, during this period, the US overtook the likes of India in measures such as urbanization and industrial production

- In effect, there is a strong argument that the reversal is closely linked to some countries taking advantage of the benefits of industrialization

- Having established this, AJR next take a look and evaluate the various hypotheses presented for explaining LR economic performance

1. The Geography Hypothesis
   - The basic claim is that differences in economic performance reflect differences in time-invariant geographic, climatic and ecological differences
   - Climate could have a direct effect on work effort, productivity, and agricultural productivity
   - Diamond (1997) argues that the timing of the Neolithic revolution has had a long-standing effect on economic and social development
   - Sachs (2000, 2001) emphasizes the effects of disease environment, transport, and technology
   - However, this hypothesis is clearly inconsistent with the reported "reversal": whatever is making former colonies rich today is very different from the situation in 1500!
2. The Sophisticated Geography Hypotheses
   - These hypotheses, on the other hand, emphasize the importance of time-varying effects of geography
   - One prominent hypothesis is "temperate drift" → tropical areas were beneficial for early civilizations, but with the arrival of advanced technologies, temperate areas became more productive! However, AJR's analysis is not favorable to this:
     - Regressions find little evidence of significance of geographic variables
     - If it were true, the reversal should have been associated with the spread of European agricultural technologies (16th – 18th c.). In other words, the timing is wrong!
   - It could also be argued that the certain geographic characteristics (better access to trade or certain resource endowments) were conducive to industrialization
     - Again, the regressions find little evidence of this and therefore AJR find little support for these sophisticated geography hypotheses either!
3. The Institutions Hypothesis
   - According to this hypothesis, societies with a social organization that provides encouragement for investment will prosper;
   - Many authors have in particular emphasized the importance of good property rights!
     - This means security against expropriation and that this protection is applied to a broad cross-section of the society
   - Another key component of this hypothesis is that institutions persist, and extractive institutions which do not encourage development may be an equilibrium condition!
   - As a result, AJR argue that **"European colonialism not only disrupted existing social organizations, but led to the establishment of, or continuation of already existing extractive institutions in previously prosperous areas and to the development of institutions of private property in previously poor areas**" (1263)
   - In other words, there was an institutional reversal!
   - Why was extraction more likely in relatively prosperous areas?
     - The economic profitability of alternative policies
     - Whether Europeans could settle or not (disease environment, population density)

    - Finally, AJR note that they do not rule out the importance of geography during earlier periods, or working through institutions
        - Mortality rates and geographic factors certainly played some part in shaping the institutions!
- Having outlined the institutional hypothesis, AJR then provide econometric evidence on the institutional reversal, regressing three variables for institutions on urbanization and population density in 1500: (results in next section)
    - Protection against expropriation between 1985-95 (from Political Risk Services)
    - Constraints on the executive in 1900 (Polity III)
    - Constraints on executive in first year after independence (Polity III)
- Next, AJR provide evidence that institutional differences account for the reversal in relative incomes.
    - In particular, their hypothesis is that population density or urbanization in 1500 affect income today only via institutions
    - To verify this, AJR run a regression of income pc today on current institutional variables (instrumented with settler mortality) and urbanization/density variables
    - The results are as expected: once they account for the effect of institutions, urbanization and population density in 1500 have no significant effects on income pc today!
- Finally, AJR examine why the reversal in relative income took place during the 19th c.
    - Basic hypothesis is that institutional differences matter a lot more in the age of industry and with new technologies than under an agricultural society!
    - To do this, AJR regress GDP in the late 19th and early 20th c. on "constraints" on the executive during this period, UK Industrial output, and an interaction of the two
    - A positive interaction term suggests that countries with PRIs too better advantage of the opportunities to industrialize!
    - Results? In a number of specifications, this term is positive and statistically significant!
    - In fact, a significant fraction of current income differences can be attributed to the effect institutions played in the surge of industrialization

Results:
- The results of the main regressions (outlined above) are encouraging:
    - In all cases, there is a negative relationship between urbanization in 1500 and income pc today, and it is significant at the 5% in almost all cases!
    - When performing the regression with population density, in all specifications they find that countries with higher population density in 1500 are substantially poorer today
- The results of the econometric analysis of the institutional reversal suggests that countries which were prosperous and densely settled in 1500 ended up with worse institutions after European intervention, and are relatively less prosperous today.

Conclusions:
- In conclusion, AJR convincingly argue for the existence of a 'reversal of fortune', show that this was driven by institutional differences, and that the reversal took place during the period of industrialization!

Comments & *Additional Notes*:

Title: Dynamics and Stagnation in the Malthusian Epoch
Author(s): Quamrul Ashraf & Oded Galor
Journal: The American Economic Review
Year: 2011

Hypothesis & Relevant Questions:

- This paper tests the main pillar of the Malthusian theory: that in the pre-industrial era, technological improvements and resource expansion led to larger populations but no long-term increases in income per capita.
- It exploits exogenous sources of cross-country variation in land productivity and technological levels to examine their *differential* effects on pop. density and income pc in the period 1-1500CE

Area of Research & Relevant Previous Literature Historical Background:

- The basics of the Malthusian theory is that (see Malthus (1798)):
  - "The stagnation in income per capita during the preindustrial epoch reflected the counterbalancing effect of population growth on the expansion of resources, in an environment characterized by the positive effect of the standard of living on population growth with diminishing labor productivity" (2004)
- A crucial event in the onset of economic development worldwide was the Neolithic Revolution → an earlier onset of agriculture gave those regions a development head start!
  - See Diamond (1997)
  - A&G use the onset of the NR s a proxy for the variation in the level of tech. advancement
- Then, A&G use variation in favorable biogeographical factors (i.e. prehistoric domesticable species of plants and animals) as exogenous sources of variation in the onset of the NR
  - This is done to be sure the relationship between the onset of NR and the Common Era is not spurious

Data Used & Its Sources:

- Comprehensive data on population and income per capita since 1CE are assembled by McEvedy & Jones (1978) and Maddison (2003)
- Population density of a country is calculated as population divided by total land area
- Measure of land productivity:
  - Percentage of arable land
  - Index of overall suitability of land (from Ramankutty et al. (2002) and aggregated by Michalopoulos (2008)
- Timing of the Neolithic Revolution constructed by Putterman (2008)
- Index of technological sophistication (used as alternative to onset of NR)
  - Data from Peregrine's (2003) Atlas of Cultural Evolution
  - Reports level of tech advancement in: communication, industry, transport, agriculture
  - Index constructed using methodology of Comin et al (2008)

Methodology:

- The Malthusian model relies on two key assumption:
  - Positive effect of the standard of living on population growth
  - Decreasing returns to labor due to a fixed factor of production - land
- Firstly, A&G develop the Basic Malthusian model as an overlapping generations economy in which activity extends over infinite discrete time (developed on a separate sheet)
  - Optimization of individuals' utility function subject to budget constraint
  - Result: Technological improvements increase the adult population and pop. density; they do not affect the steady state of income per worker
- After developing the model, the Malthusian theory yields 2 testable predictions:
  - Within a country, an increase in productivity would lead to a larger population in the LR without altering LR income pc
  - Across countries, more developed ones would be distinguished by higher LR population densities, but their standard of living would not reflect this!
- The first step A&G take is to ensure that the onset of the NR is a good proxy
  - This is done by regressing onset of NR on level on index of tech sophistication in CE
  - Results justify the use of the NR as a proxy for level of tech advancement in nonagricultural sectors
- Next, A&G present the baseline specifications adopted:

$$\ln P = \alpha_0 + \alpha_1 \ln T + \alpha_2 \ln X + \alpha_3 \Gamma + \alpha_4 D + \delta_i$$

$$\ln y = \alpha_0 + \alpha_1 \ln T + \alpha_2 \ln X + \alpha_3 \Gamma + \alpha_4 D + \varepsilon_i$$

  - P is population density; y is income pc; T is years elapsed since NR; X is land productivity; Γ is a vector of geographical controls; D is a vector of continent dummies
- A&G start off by looking at the baseline specification for pop. density in 1500CE
  - Examine the effects of the transition-timing and land productivity channels
  - The results are statistically significant throughout!
  - Also, a very interesting point is that in 1500CE it seems that economic development was on average higher at latitudinal bands closer to the equator
- Even though these results are encouraging, A&G worry about the potential endogeneity of the transition-timing variable, in particular, omitted variable bias:
  - Following Diamond (1997), A&G use availability of prehistoric domesticable wild plant and animals as an IV. They claim domesticates did not influence population density in the Common Era through any other channel than through the timing of the NR!
  - Data on numbers of prehistoric domesticable species is obtained from Olsson & Hibbs (2005)
- Next, A&G run the same specification for the periods 1000CE and 1CE:
  - Results are strikingly similar, which gives significant credence to the Malthusian theory
  - Of course, A&G also run these specifications using the IV strategy → consistent results!
  - NB: Although the coefficients on land productivity are very similar across all specifications, the coefficients on onset of NR clearly diminish across time. This supports the claim that the NR conferred social gains characterized by diminishing returns over time!

- Next, A&G turn to the second baseline specification, considering income pc
  - Income pc capita is effectively neutral to the timing of the NR, agricultural productivity of land and other productivity enhancing geographical factors
  - These results are robust to several different sample weighting specifications
- Next, A&G use their index of technological sophistication in the 1000CE and 1CE
  - This is used instead of the onset of the Neolithic Revolution
  - Consistent with the Malthusian theory, the regressions indicate highly significant positive relations between tech sophistication and land productivity in the two period on population density and no significant impact on income per capita
- Having done this successfully, A&G work to establish the causal effect of technology on population density in 1000CE and 1CE
  - Because the index of technology used is contemporaneous to the population density, A&G worry about endogeneity, reverse causality, and unobserved heterogeneity
  - To do this, A&G first construct a non-agriculture index of technological sophistication and regress their base specification on it (both OLS and IV)
  - The causal link is established! The onset of the NR had a strong and statistically significant effect on non-agricultural technological sophistication in 1CE and 1000CE!
  - Then, having done this A&G regress population density in 1000CE and 1 CE on the level of tech specification, instrumented by prehistoric availability of domesticates!
  - Result: In line with Malthusian theory, improvements in the tech environment were channeled into population growth and more densely populated societies
- Next, A&G carry out a robustness check for 1500CE by taking into account the technology-diffusion hypothesis
  - The idea is that spatial proximity to the technology leader of the region confers a beneficial effect on development by facilitation tech diffusion, trade, etc
  - Variable: great-circle distance from the country's capital to the closest of eight worldwide regional technological frontiers
  - Result: This variable is indeed a statistically significant determinant of pop density in 1500CE, but not of income per capita
  - Additionally, the coefficients on the transition-timing and land-productivity channels are still positive and statistically significant
- Finally, A&G examine the robustness of their empirical finding by constructing a first-difference model to be able to eliminate any time-invariant country fixed effects!
  - Between the periods 1CE and 1000CE, A&G examine the change in technology on changes in population density and changes in income per capita
  - This allows A&G to also address an alternative non-Malthusian theory:
    - Migration driven theory predicts that tech improvement will not increase income pc in the given region but will increase income pc in all regions due to cross-regional migration and equalization of wages
  - Results confirm the Malthusian viewpoint! Also reinforces the theory in that changes in technology led to higher population densities but not higher income pc

Results:

- The main results:
  - Strong positive and statistically significant effects of land productivity and time elapsed since NR on population density in 1500CE, 1000CE, 1CE
  - These results are robust to a number of geographical controls which may have affected aggregate productivity either directly (e.g. affecting land productivity) or indirectly (e.g affecting trade and tech diffusion)
  - Also, they are robust when the index of tech sophistication is used in lieu of NR
  - Finally, the two key explanatory variables have no statistically significant impact on income per capita in the abovementioned time periods
- IV results (for 1500CE): onset of the NR (instrumented) as well as land productivity both have positive and strong statistically significant impact on population density!

Conclusions:

- In addition to all of these results, the paper uncovers 3 additional findings:
  - Relationship between absolute latitude and preindustrial development
  - Importance of technological diffusion (distance to frontier) in determining population density
  - First test of Diamond's (1997) hypothesis regarding the onset of the NR and the contribution of domesticates
- The Malthusian stagnation of income per capita masks significant dynamism in the epoch. The intense technological progress during the region was instrumental for the eventual emergence of economies from the Malthusian trap!

Comments & *Additional Notes*:

Title: The Challenges Facing Landlocked Developing Countries
Author(s): Michael Faye, John McArthur, Jeffrey Sachs, Thomas Snow
Journal: Journal of Human Development
Year: 2004

Hypothesis & Relevant Questions:

- Why do landlocked countries struggle to develop even in an era of great technological improvements in transportation and globalization?
- Apart from distance from coast (i.e. access to world markets), the paper argues that at least four types of dependence on transit neighbors are also very important

Area of Research & Relevant Previous Literature Historical Background:

- Adam Smith observed in 1776 that inland parts of Africa & Asia were underdeveloped
  - His explanation: difficulty of trade → difficulty to specialize labor; land transportation over large distances is very costly
  - However this is not enough. A further crucial factor is the dependence on passage through a sovereign transit country to access shipping markets

Data Used & Its Sources:

- Human Development Index
- For Cost of trade, the authors use the ratio of transportation and insurance costs to value of exports
- Exports per capita

Methodology:

- First, the authors look at the HDI and compare landlocked to maritime countries
  - 9/12 countries with lowest HDI are landlocked
  - Landlocked countries do worse than maritime neighbors in each HDI component
- To take into account the downward bias caused by Sub-Saharan Africa, the authors next separate the HDI table by region
  - Not one landlocked country outside S. Africa has a higher HDI than the average of its region
  - An interesting observation is regarding the variation in HDI scores in different regions. In Africa, scores are diverse. However, former Soviet republics are very close together
- Next, the authors look at trade costs:
  - Using the ratio of transportation costs, they see that the ratio is around9% greater for landlocked countries than for maritime countries!
- Next, the authors look at exports per capita:
  - Very few landlocked countries outperform the regional average

- Next, the authors turn to the main section of their research. They argue that much of the underdevelopment of landlocked countries can be attributed to various forms of dependence on other countries for transit. This dependence can take at least four forms
  - The relative impact of each of these challenges varies. It is essential, therefore, to consider how each aspect interacts with a country's economic structure
  - In order to better illustrate this, the authors highlight some of the worst and least affected countries for each aspect

1. Dependence Upon Infrastructure of Transit Countries
   - This imposes direct costs on trade and limits the ability to transport products
   - May arise due to poor governance, natural disasters, conflicts, etc
   - A particular problem for countries which export primary commodities
   - Also limits the return to investment on landlocked country's internal infrastructure
   - Worst Affected: Eastern Africa (e.g. Burundi); Western Africa (e.g. CAR)
   - Least Affected: those which do not rely on land transport and primary commodities; some countries could actually benefit from developed maritime neighbors
     - Botswana (export of diamonds; air transport)
     - Bolivia (S America's fiber-optics hub)
     - Laos (could benefit from Thailand's infrastructure)
2. Political Relationship Between Landlocked and Transit Countries
   - Any sort of conflict, military or diplomatic can severely impede the openness to trade
     - Borders can be blockaded often; imposition of trade restrictions
   - Although the UN Convention on the Law of the Sea provides some rights to landlocked transit, these have to be agreed upon with the transit neighbor
   - Worst Affected: countries of the South Caucasus and Central Asia
     - Uzbekistan and its neighbors
     - Fighting between Armenia and Azerbaijan
     - Ethiopia has suffered from conflict with its transit neighbor, Eritrea
     - Disputes between Nepal and India in the 1990s
     - Tensions between Bolivia and Chile
   - Least Affected: Southern African countries have experienced less of this
     - Attempts at regional cooperation: Southern African Transport and Communications Commission
     - Reintroduction of East African Community in E Africa
3. Vulnerability to Civil Conflict Within Transit Countries
   - Landlocked countries must rely on peace and stability within transit neighbors
   - Worst Affected: Landlocked countries in Africa
     - Mali (although peaceful) has suffered greatly from conflict in each of its neighbors
     - Malawi struggling due to civil wars in Mozambique, Namibia, Angola
     - During the 1990s, the dissolution of the USSR led to several internal conflicts in Central Asia and the South Caucasus
   - Least Affected: There are few countries left unaffected by this
     - Bolivia and Paraguay
     - Countries of South and SE Asia

4. High Administrative Burden due to Transit
   - These include border crossings, shipping costs, paperwork, bureaucratic procedures, long delays in transit, variability of time in transit
   - Worst Affected: Most regularly cited in reports on W and E Africa
     - Full journey from port of Doala and Bangui can take 3-4 weeks
     - Usually, there is a lack of coordination between landlocked/transit countries
     - Corruption has imposed significant costs on trade in Central Asia; worsening relations between former Soviet Republics (NB: there were no such administrative burdens between them during Soviet era)
   - Least Affected:
     - Best example is Bhutan. It has strong relations with India, and can trade as if it were not landlocked (also, it doesn't trade that much!)
     - Efforts to reduce administrative costs have taken place at regional levels → Southern African Development Community (SADC); Common Market for Eastern and Southern Africa (COMESA)

- Having done this, the authors present several key policy implications:
  1. Landlocked countries need to place emphasis on developing internal infrastructure
  2. Regional infrastructure integration strategies are needed
     - Expand market access
     - Building and maintaining efficient maritime ports
  3. Regional integration strategies are need to focus on administrative coordination
     - Guaranteed permanent access to transit routes
  4. Landlocked countries need to invest in developing industries less affected by transport costs
     - Shift focus away from primary commodities
     - Focus on service and manufacturing industries
  - Official development assistance to developing countries should give special attention to these unique needs

Conclusions:

- The appropriate policies to mitigate the effects of landlockedness need to address country-specific obstacles to accessing global markets and region-specific challenges to market integration

Comments & *Additional Notes*:

Title: Why Do Some Countries Produce So Much More Output Per Worker Than Others?
Author(s): Robert Hall; Charles Jones
Journal: The Quarterly Journal of Economics
Year: 1999

Hypothesis & Relevant Questions:

- Explain the variation in long-run economic performance by studying directlythe cros-section relation in levels
- Big Questions:
  - Why do some countries invest more than others in physical/human capital?
  - Why are some countries so much more productive than other?
- Hypothesis: Differences in capital accumulation, productivity and therefore output per worker are fundamentally related to differences in social infrastructure
- Stu

Area of Research & Relevant Previous Literature Historical Background:

- What do H&J mean by social infrastructure (SI)?
  - Institutions and gov't policies conducive the investment, productivity, output
  - Allow individuals to capture the social returns to their actions as private returns (see North & Thomas (1973))
  - Social infrastructure exists to protect people from 'diversion' – both public & private
  - "The value of SI goes far beyond the notion that collective action can take advantage of returns to scale in avoidance. It is not that the city can put up fences more cheaply than can individuals: in a city run well, no fences are needed at all" (95)
  - In addition to direct effects on production, good SI can also have positive indirect effects by encouraging new technologies and ideas
- Social Action is a prime determinant of output/worker in almost any view
  - Important Literature: Olson (1965, 1982), Baumol (1990), North (1990), Greif & Kndel (1995), Weingast (1995)
  - Unfortunately, there may be both a bad equilibrium (where diversion is common and has a higher payoff) and a good equilibrium
- The hypothesis of H&J can be neatly summarized as such:

Social Infrastructure → (Inputs, Productivity) → Output per Worker

  - Allows H&J to distinguish between the proximate causes (capital, productivity) and the fundamental causes (i.e. social infrastructure, SI)
  - Use production-productivity analysis to trace the impact of SI on capital accumulation and productivity
- Use a set of geographic and linguistic characteristics as IVs to control for SI endogeneity

Data Used & Its Sources:

- H&J focus their research on data from 1988; dataset includes 127 countries
- National income, product account, and labor force data → Summers and Heston (1991) revision of the Penn World Tables
- Average educational attainment as reported by Barro & Lee (193)
- Physical capital stocks are constructed using the perpetual inventory method
- The returns to education function, Φ(E), is assumed to be piecewise linear
- The ideal measure of SI would be the 'wedge' between the private return to productive activities and the social return to such activities
  - Of course, no such measure exists and so H&J have to use proxies!
  - Their measure of SI comes from combining two indices:
  1. Index of Government Anti-Diversion Policies (GADP) from Political Risk Services
  2. Index of extent to which a country is open to international trade
     - Tariffs, quotas, trade barriers are lucrative opportunities for private/public diversion
     - Use an index from Sachs & Warner (1995): fraction of years between 1950-1993 that the economy has been 'open'

Methodology: '

- One important methodological difference with a lot of empirical growth literature is that H&J use levels instead of rates of growth
  - Levels of performance are much better indicators of welfare
  - Growth rates may be transitory; Jones (1995), Easterly et al. (1993)
  - Recent models imply that countries will grow at a common rate in the LR; Barro and Sala-i-Martin (1995)
- The first step is to decompose differences in output per worker into differences in inputs and differences in productivity
  - H&J do this with a simple Cobb-Douglas production function

$$Y_i = K_i^{\alpha} \left(A_i H_i \right)^{1-\alpha}$$

$$H_i = e^{\phi(E_i)} L_i$$

  - K is physical capital; H is human capital-augmented labor; A is labor-augmenting productivity; L is labor; E is years of schooling
  - Φ(E) reflects the efficiency of labor → estimated using Mincer (1974) approach
- The production function can easily be represented in terms of output per worker:

$$y_i = \left(\frac{K_i}{Y_i} \right)^{\alpha/(1-\alpha)} h_i A_i$$

  - In the above, h is human capital per worker!
- With this simple approach, H&J are able to decompose differences in output per worker into differences in (i) capital-output ratio, (ii) educational attainment, and (iii) productivity
- Next, H&J use the data outlined above to carry out this decomposition. Note that the contribution from productivity is calculated as the residual
  - In Hall & Jones (1996), the authors formulate results using Solow's method of spatial ordering of observations. However, the results are broadly similar

- It is also important to note that the above decomposition involves no econometrics, but accounting. It is an important contrast with Mankiw, Romer, Weil (1992)
  - Important because, for example, H&J do not impose orthogonality between productivity and the inputs when calculating the residual!
- Ultimately, the conclusion from this decomposition is that there a majority of the variation is due to the mysterious 'productivity' residual. Need a theory to explain what it is!
  - Parente & Prescott (1996) construct a theory in which 'insiders' may prevent new technologies from being adopted
- To examine the quantitative importance of differences in SI on output/worker, H&J introduce the following structural model:

$$\log\left(Y/L\right) = \alpha + \beta S + \varepsilon$$

$$S = \gamma + \delta \log\left(Y/L\right) + \theta X + \eta$$

  - Where X is a vector of other variables
- There are several important features of the above framework:
  - H&J explicitly recognize SI as an endogenous variable!
  - First equation is parsimonious → reflects the hypothesis of SI as *the* fundamental factor!
  - Identifying Assumption: The determinants of SI affect Y/L only through SI
    - Given this, *any* subset of SI determinants constitute valid instruments for the estimation of parameters in the 1st equation!
  - Finally, H&J highlight that their measure of SI is a proxy and will be related to true SI through random measurement error:

$$S = \tilde{S} - v$$

$$\log\left(Y/L\right) = \alpha + \beta \tilde{S} + \tilde{\varepsilon}$$

$$\tilde{\varepsilon} = \varepsilon - \beta v$$

    - However, the beta will be identified through the orthogonality between the determinants of SI and the error when using an IV approach!
- Next, H&J introduce their instruments for the IV regressions
  - Their instruments are various correlates of the extent of W. European influence
  - Use characteristics of geography (e.g. distance from equator) and linguistics (e.g. extent to which primary languages of W Europe are spoken as 1st languages today)
    - H&J argue for the former because Europeans (i) settled in sparsely populated areas and (ii) Europeans settled in areas of broadly similar climate
  - Finally, H&J use an instrument from Frankel & Romer (1996): log predicted trade share of the economy, based on population and geographical features only
- After presenting their basic results, H&J address the potential measurement error in SI, and whether that might be having a significant bias
  - Under their identifying assumption, H&J conclude that SI is a powerful causal factor of higher output/worker
- Next, H&J analyze the impact of SI on the different components of the production f-n
  - Conclusion: Countries with good SI have higher capital intensity, higher human capital per worker and higher productivity!

- Next, H&J calculate the extent to which differences in SI can explain the observed variation in output per worker and its components
  - Result: Differences in SI can account for a substantial amount of the observed variation in capital intensity, human capital/worker, and productivity
- Finally, H&J test the robustness of the first equation of their structural model using a set of controls
  - These include: ethnolinguistic fractionalization, distance from equation, religious affiliation, population, capitalist system indicator, continent dummies, density of economic activity
  - As hoped, the coefficient on social infrastructure remains little changed, positive and highly significant. The coefficients on the controls are insignificant, since they should only be having an impact through SI!

Results:

- The results of the initial decomposition are staggering:
  - Overall, the differences in output per worker are enormous, up to a factor of 30
  - However, a large part of this can be attributed to differences in productivity (about a factor of 8), while differences in inputs explain around a factor of 4
- Basic point estimates of the first regression of the structural model suggests that a 0.01 increase in SI (scale is 0-1) will increase output per worker 5.14%
  - This estimate is robust to using a smaller sample and different # of instruments

Conclusions:

- A country's LR economic performance is determined primarily by the institutions and government policies that make up the economic environment
- Variation in inputs account for only a small proportion of the differences in output per worker. Much of the variation is explained by the productivity residual
- More fundamentally, both productivity and input differences are driven by variations in SI
  - A major component of SI present in countries is the extent to which they have been influenced by Western Europe

Comments & *Additional Notes*:

Title: The Persistent Effects of Peru's Mining Mita
Author(s): Melissa Dell
Journal: Econometrica
Year: 2010

Hypothesis & Relevant Questions:
- What has been the long-term impact of the *mita*, an extensive forced mining labor system used in Peru and Bolivia between 1573 and 1812?
- Why would the mita affect economic prosperity nearly 200 years after its abolition?

Area of Research & Relevant Previous Literature Historical Background:
- Uses variation in the assignment of an historical institution in Peru to identify land tenure and public goods as channels of institutional persistence
- What was the *mita*?
  - Forced labor mining system by Spanish gov't; started 1573, constant from 1578 onwards
  - Required over 200 indigenous communities to send 1/7 of their male population to work in Potosi silver and Huancavelica mercury mines
  - With silver deposits depleted, the mita was abolished in 1812
- Literature establishing a relationship between historical institutions and economics
  - AJR (2002); Nunn (2008); Banjeree & Iyer (2005); Glaeser & Shleifer (2002)
- A very interesting finding is that *haciendas* which formed in the 17th century might have (contrary to common knowledge) had a positive impact on public good provision and investment in those regions
- Two criteria were used to assign the mita
  - Distance to Pososi and Huancavelica – more costly the further away
  - Elevation – Spanish believed highland people were better suited to mine work
- Dell focuses on the mita boundary that transects the Andean range (see map)
  - Could other underlying characteristics have influenced mita assignment?

Data Used & Its Sources:
- Mita assignment varies at the district level
- Use two independent data sets to measure living standards (district level)
  - 2001 Peruvian National Household Survey → household consumption
  - Micro-census data set that records heights of children → to measure stunting
- Controls for exogenous geographic characteristics
  - Mean area weighted elevation
  - Mean area weighted slope
- Data from Spanish Empire and Peruvian Republic to test channels of persistence

Methodology: '
- Dell examines the impact of the mita by testing whether it affects living standards today
- KEY: Contribution of mita conscripts changed discretely at the boundary of the region!
  - Because of this, Dell uses a regression discontinuity (RD) approach to evaluate the LR effects of the mita

    - Mita boundary forms a multidimensional discontinuity in longitude-latitude space
- Because the RD requires all relevant factors beside the mita to vary smoothly at the boundary, Dell focuses on the portion that transects the Andean range in S Peru
- The basic regression form used by Dell is:

$$c_{idb} = \alpha + \gamma mita_d + X_{id}^{'}\beta + f\left(geographic\ location_d\right) + \phi_b + \varepsilon_{idb}$$

    - C is the outcome variable for observation i in district d along segment b of the mita boundary; mita is an indicator for whether the district contributed to the mita; X is a vector of covariates;
    - f(.) is the RD polynomial → controls for smooth function of geographic location
    - Finally, ϕ is a set of boundary segment fixed effects
- The RD approach used requires two identifying assumptions:
    - All relevant factors besides mita treatment must vary smoothly at the boundary!
        - Dell examines various characteristics to makes sure this holds: elevation, soil fertility, rainfall, ethnicity, etc.
        - No evidence of significant differences in these across the mita boundary
    - Treatment effect is identified using only the variation at the discontinuity (ideally)
        - Uses a semiparametric RD approach that limits the sample to districts within 50km of the mita boundary → allows to identify the causal effects of the mita treatment
- Provides three baseline specifications of the RD polynomial
    - Cubic polynomial in Latitude & Longitude, Distance to Potosi, or Distance to Mita Boundary
    - Projecting variable into a lower-dimensional space
- Important Assumption with RD: No selective sorting across the treatment threshold
    - If the direct mita effect provoked substantial out-migration of productive individuals
    - Those individuals carry on good heritable characteristics → persistence over time
    - There is no significant evidence of migration between the two types of districts
- Provides robustness checks with 14 different specifications of the RD polynomial
    - Generally, the results on stunted growth and household consumption are similar (and significant) across most of the various specifications!
- Additional robustness checks
    - Controls for ethnicity, Cusco, migration, flexible consumption estimation
    - Also, Dell shows that the mita effect did not exist prior to 1573, which is crucial!
- Dell focuses on three channels of persistence for the mita effect:

1. Land Tenure and Labor Systems
    - Spanish crown was dismantling the existing *encomiendas* in the 1570s, which opened up the opportunity for establishing the mita
    - Examines the effect of the mita on the formation of *haciendas* – rural estates with an attached labor force permanently settled on the estate
    - NB: Spanish minimized the establishment of haciendas in mita districts!
    - Dell documents a very large negative mita effect on concentration of haciendas in the 17th century! Disparities persisted after mita was abolished in 1812!
    - After the mita ended, enforceable peasant titling was not established in those districts → opened the door to rebellions, intimidation and conflicts!

- After haciendas were abolished in 1969, past mita districts had significantly greater land inequality in 1994; these districts were very disorganized!

2. Public Goods
   - The mita effect on educational attainment is generally weak nowadays!
   - However, Dell finds a significant mita effect on disparities in regional road networks, which connect population centers to each other
   - Hypothesis: presence of large landowners (non-mita districts) provided a stable land tenure system that encouraged public goods provision!
3. Proximate Determinants of Household Consumption
   - Dell focuses on the effect on the labor force and market participation; no substantial evidence of differences in investment
   - While the mita effect on % of labor force in agriculture is very limited, there is a substantial effect on market participation
   - Therefore, there is evidence of more subsistence farming in mita districts. Consistent with evidence of poor infrastructure and high transportation costs

Results:

- Dell begins by investigating the mita's impact on living standards today
  - LR mita effect lowers household consumption in 2001 by around 25%
  - Right at the boundary, the mita effect on stunted growth (dummy var) varies between 5 and 11 percentage points; mean prevalence is 40% in the whole regio

Conclusions:

- "This evidence suggests that exploring constraints on how the state can be used to shape economic interactions – for example, the extent to which elites can employ state machinery to coerce labor or citizens can use state guarantees to protect their property – a more useful starting point than land inequality for modeling Latin America's long-run growth trajectory"

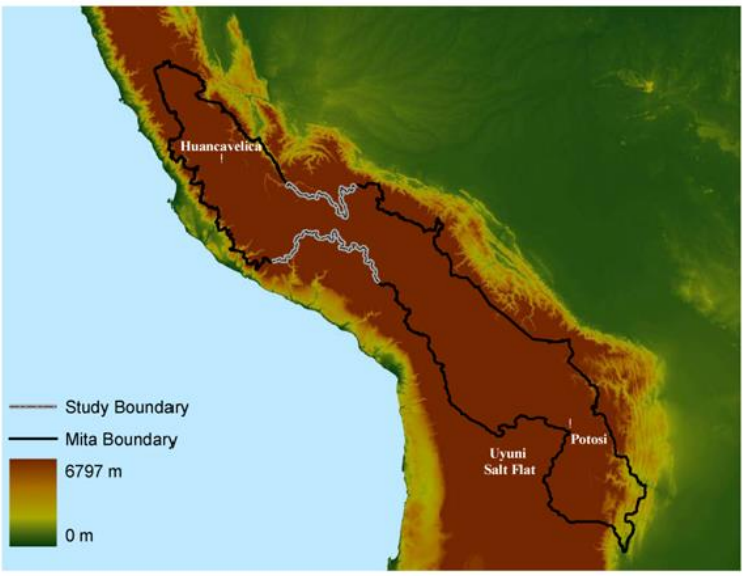

FIGURE 1.—The *mita* boundary is in black and the study boundary in light gray. Districts falling inside the contiguous area formed by the *mita* boundary contributed to the *mita*. Elevation is shown in the background.

Title: The Wind of Change: Maritime Technology, Trade, And Economic Development
Author(s): Luigi Pascali
Journal: Working Paper
Year: 2013

Hypothesis & Relevant Questions:

- Why was there an enormous increase in world trade between 1820-1913, and especially after 1870? It cannot be explained only by rising GDP or population
- The Fact: Invention of steamship produced asymmetric changes in shipping times!
- The Big Idea: These asymmetric changes are used to identify:
  - Effect of adoption of the steamship on trade patterns and volumes
  - Effect of int'l trade on economic development

Area of Research & Relevant Previous Literature Historical Background:

- Trade systems historically tended to follow a triangular pattern among Europe, Africa, West Indies and the United States
  - Therefore, geographical distances might not be a strong predictor of the trade distance between different ports and countries!
- The transition from sail to steam was *rapid* → accelerated rapidly after 1870s, and the transition was complete by 1910 → efficiency increased a lot!
- NB: Introduction of steamship reduced average shipping time by more than half!
- Big Question: What part of the increase in international trade is explained by the shift from sail to steam in the maritime industry?
  - Literature has argued for the importance of income growth, currency unions, declining freight rates, income convergence and tariff reductions, global market integration
  - The problem is that they all use *freight rates* to proxy for changes in transportation costs → but these are simply prices determined by D&S, not only tech. shocks
  - Also, there is the problems that prices were heavily controlled by cartels → not fully flexible
  - In other words, there is an endogeneity bias here!
- Research contributes to several strands of literature:
  - To the debate over the importance of reduced transportation costs in spurring international trade; importantly, argues that usage of freight rates → endogenous!
    - Frieden (2007) and James (2001): steamships promoted cross-country integration
    - O'Rourke & Williamson (1999) and Estevadeordal et al (2003) focus on income growth in explaining increases of trade; lower costs; gold standard
  - To the debate on the effects of trade on development – surprising result!
    - Frankel & Romer (1999); Rodriguez & Rodrik (2000)
  - To the debate between neoclassical trade theories and new economic geography theories → this paper supports the second school of thought
    - NEG: Krugman (1991); Krugman & Venables (1995); Crafts & Venables (07)
  - To the literature which shows convincingly that strong institutions are critical for economic growth → this paper provides an additional (and novel) channel
    - AJR (2001), Engerman & Sokoloff (1994); La Porta et al (1997)

Data Used & Its Sources:

- Uses Three Novel Data Sets:
  - 1st: Information on shipping times using sailing tech. for 16,000 country pairs
    - Calculated by author, using CIESIN, IFREMER, NCAR data sets for land/sea, wind directions/speeds, and ocean currents
    - "World matrix was transformed into a *weighted, directed graph*"
    - Minimum travel times between any two nodes calculated with Dijkstra's algorithm
    - These calculations perfectly reproduce routes followed by the real journeys
  - 2nd: More than 23,000 bilateral trade observations for nearly 1,000 distinct country pairs; 5,000 observations pertaining to total exports of these countries
    - Combination of primary and secondary sources used
    - Importantly, the data cover the entire second half of the century
  - 3rd: Information on urbanization rates worldwide
    - 3 Measures: Population, per-capita income and urban population
    - Income data from Maddison (2004)
    - For urbanization → % of population living in cities with > 25, 50, 100 thousand
- Data covers 129 countries from 1850-1900
- For institutions, focus on "checks against expropriation" (property rights protection)
  - Uses dataset POLITY IV for this variable

Methodology: '

- Standard Ricardian or Heckscher Ohlin approach to trade liberalization
- Use a *gravity-type regression* → determined when distances in terms of time to sail by steamship became relevant in explaining patterns of trade worldwide

$$\ln\left(trade_{ijt}\right) = \ln\left(y_{it}\right) + \ln\left(y_{jt}\right) + \left(1-\sigma\right)\ln\left(\tau_{ijt} + \ln P_{it} + \ln P_{jt}\right) + \varepsilon_{ijt}$$

  - τ is the bilateral resistance term, P is the country-specific multilateral resistance term
  - Specification from similar models: see Anderson & van Wincoop (2003)
  - Basically, trade is inversely related to distance and positively related to country size!
  - Introduction of steamship was responsible for both a change in relative bilateral frictions and a reduction in international frictions relative to intranational ones
- However, in contrast to most literature which uses point-to-point great circle distances as proxy for the bilateral resistance term, LP uses shipping and sailing times as such:

$$\ln\left(trade_{ijt}\right) = \beta_{steam,T}\ln\left(steamTIME_{ij}\right) + \beta_{sail,T}\ln\left(sailTIME_{ij}\right) + X_{it}\Gamma + \gamma_t + \varepsilon_{ijt}$$

  - Where X controls for the income and multilateral resistance terms
  - Coefficient on sail time is negative and significant between 1850-1860, increases between 1860-1870 and is insignificant afterwards
  - Coefficient on steam time is initially insignificant but becomes negative and significant after 1860
  - Result: Over time country pairs that were relatively closer by steam than by sail experienced the greatest increases in trade

- To estimate the effect of reduction in shipping times induced by the introduction of the steamship on int'l trade volumes, we regress the log-change in per-capita trade (between 1860 and 1900) on the average change in shipping times across all trading partners generated by the introduction of the steamship

  $$\Delta \log T_i = \alpha \Delta \log Dist_i + \nu_i$$

  $$\Delta \log Dist_i \equiv \sum_{i \neq j} \omega_j \left[\ln\left(sailTIME_{ij}\right) - \ln\left(steamTIME_{ij}\right) \right]$$

  - Importantly, this regressor is exogenous w.r.t. the market structure!
  - The elasticity α can be interpreted as the effect of the introduction of the steamship on international trade by reducing sailing time
  - Result: Effect of isolation (average travel times) on trade is negative and highly significant
  - There is a cost in doing this, however → we need to make an assumption regarding the exact relationship between sailing times and transportation costs
  - However, we can infer the role of the introduction of steam vessels on per-capita trade → with conservative estimates, the steamship is responsible for at least 53% of the trade boom occurred between 1860-1900 → surprisingly large
- Use an *instrumental variable approach* → measure effect of steamship on trade boom during 19th c. using an actual technological improvement – reduction in sailing times – rather than on freight rate indexes

  $$\log\left(1+Y_{it}\right) = \gamma \log\left(T_{it}\right) + \gamma_i + \gamma_t + \nu_{it}$$

  - Country i's actual trade in year t is instrumented with the geographic isolation of the country determined by the prevailing technology in the year
  - LP isolates the geographic component of country i's bilateral trade as such:

    $$\log \mathrm{PT}_{ijt} = \hat{\beta}_{steam,t} \ln\left(steamTIME_{ij}\right) + \hat{\beta}_{sail,t} \ln\left(sailTIME_{ij}\right)$$

    $$\log PT_{it} = \sum_{i \neq j} w_j \log PT_{ijt}$$

  - Change in sailing times is arguable *exogenous*
  - Very important here is that the instrument for trade is time-varying!
  - Then, use the predicted values of this first stage in a regression for economic development (urbanization, population density, per capita income)
  - Result: The effect of trade on urbanization rates, population density, and pc income is negative, on average
    - One reason is that globalization induced many countries outside Europe to specialize in commodities
- It seems well-functioning institutions are crucial for a country to benefit from trade
  - To analyze this, the author runs a 2SLS approach, including a "Good Institutions" dummy from POLITY IV (1 if "constraints on executive" ≥ 5)

    $$\log\left(1+Y_{it}\right) = \alpha_0 \log T_{it} + \alpha_1 \left[\log T_{it} \times I\left(Good\_\mathrm{Inst}_i\right) \right] + \gamma_i + \gamma_t + \nu_{it}$$

  - Claim: the mortality of the first settlers affected the way in which urbanization and development reacted to globalization, *only* through local institutions
    - Use settler mortality as an instrument to identify causal effect of institutions

- Result: countries with inclusive institutions benefited from trade; other suffered!
- NB: The channels through which increases in the international trade hampered urbanization and population density in many countries is not clear

Results:

- Four Key Findings Emerge From This Analysis:
  - Trade patterns between 1850-1900 were shaped by shipping times by sail, mix of sail and steam, and steam in three sub-periods
  - Geographical isolation of a country induces substantial effects on its trade volumes
    - Claim: Reduction in shipping times accounted for 50% of the increase in trade!
  - Use predictions for bilateral trade based on shipping times *as instruments* in regression of trade on urbanization and development
    - Claim: Effect of trade on urbanization & development not necessarily positive
  - Quality of institutions matters a lot to benefiting from international trade → more autocratic nations actually suffered from first wave of globalization

Conclusions:

- "Policymakers who are willing to learn from history are advised to consider that a reduction in trade barriers does not automatically produce large positive effects on economic development. High-quality institutions are crucial to benefiting from trade"

Comments & *Additional Notes*:

Title: Banks & Development: Jewish Communities in the Italian Renaissance
Author(s): Luigi Pascali
Journal: Review of Economics and Statistics
Year: 2014

Hypothesis & Relevant Questions:
- Are differences in local banking development long lasting?
- Do differences in local banking affect LR economic performance?
- Examines a channel through which history affects development: evolution of banks

Area of Research & Relevant Previous Literature Historical Background:
- Relates to the literature concerning history as a main determinant of LR development:
  - AJR (2001); Engerman & Sokoloff (1994), La Porta (1997)
- LP argues that the persistence of regional divergence in Italy is partly explained by the longevity of local banking
  - Cities that hosted Catholic money-lending institutions in the 16th c. still have more bank branches pc, and more credit availability
  - To establish causality, LP uses Jewish demography during the Renaissance as a significant influence on the development of local credit markets
- Premises of the Argument:
  - Jewish residents spread from Rome to the rest of Italy over centuries
  - At the end of the 14th c., Catholics prohibited from lending for profit; Jews still could!
  - Cities which hosted a Jewish community developed complex credit markets
  - During 15th c., Franciscan empire tried to drive Jews out of financial market. It created charitable loan banks, Monti di Pieta, in places where Jews were most influential
  - Monti have survived to the present day and gave rise to contemporary Italian banks
- Final defeat of Jewish lenders came in 1682, when Innocent XI banned their pawnshops from the Papal States (later extended to all Italian states)
- Key Historical Event: Between 1504 and 1541, Jews were completely expelled from the Kingdom of Naples; they wouldn't return for 3 centuries → exogenous!
  - LP uses this to demonstrate that the unobservables which led the Jews to settle in different regions had any direct effect on current local banks
- The second question LP addresses is whether banks affect LR economic performance
  - Schumpeter emphasizes the positive influence of financial sector on rate of pc income
  - Easier to acquire information and assess different projects
  - Greenwood & Jovanovic (1989): Better info collection → increased efficiency
  - However, there is also the view that better resource allocation may depress savings rates
- Italy is a good "laboratory" for investigating the effect of banks on development
  - Italian financial system is bank-based and very important
  - Considerable spatial diversity exists in the degree of banking development
- LP uses Jewish demography in 1500 as an instrument for banking development!
- LP finally explores a particular channel through which banking institutions affect economic development → fostering aggregate productivity

Data Used & Its Sources:

- The paper uses three data sets (looks primarily at city-level):

1. The first dataset contains information on demography and local credit markets in Italy during the Renaissance
   - Data on Jewish demography for 1500CE → Attilio Milano
   - Historical urban population data from 1300-1861 → Malanima (1998)
   - Locations of the Monte di Pieta during first century of existence (1470-1570) → Meneghin (1986)
2. Second dataset contains current information on Italian municipalities (2002-2003)
   - Geomorphological data
   - Population and education levels; other economic & geographic characteristics
   - Financial data on branch density and private credit → Bank of Italy
3. Third dataset contains current information on Italian firms
   - Main source of information is Amadeus database
   - Provides comprehensive firm-level information and firm characteristics
   - This information is merged with an industry level dataset from the EU-KLEMS project

Methodology:

- The first objective is to establish the causal effect of Jewish demography during the Renaissance on current economic performance of Italian municipalities
  - To do this, the following system of equations is defined:

$$JF_i = \alpha_1 J_i^{1500} + X_i^{'}\beta_1 + v_{1,i}$$

$$MP_i = \alpha_2 JF_i + X_i^{'}\beta_2 + v_{2,i}$$

$$\log F_i = \alpha_3 MP_i + X_i^{'}\beta_3 + v_{3,i}$$

$$\log Y_i = \alpha_4 \log F_i + X_i^{'}\beta_Y + v_{4,i}$$

  - J is a dummy for cities with Jewish communities in 1500; JF and MP are cities that hosted Jewish pawnshops and Monti in 16th c.; F is current level of local banking development; Y is p.c. income; X' is a vector of covariates that affect all variables
  - 1st Equation: LP estimates that the presence of a Jewish community in 1500 increases the probability of a Jewish pawnshop in 16th c. of around 40% (excl. Naples)
  - 2nd Equation: Cities hosting a Jewish pawnshop were 50% more likely to host a Monte di Pieta
  - 3rd Equation: Confirms that a presence of a Monte between 1470 and 1570 leads to an increase in private credit/GDP in the municipality of around 50% and increases brand density by around 19%
  - 4th Equation: confirms the correlation → 1% increase in private credit/GDP (branch density) ratio increases per capita income by 0.1 percent (0.23%)
- Of course, all the above are correlations, not causal relations! To establish a causal effect of Jewish demography on economic development, LP uses a difference-in-difference approach using the expulsion of Jews from the Kingdom of Naples between 1504 and 1541

- Two Key assumptions: (i) the expulsion was exogenous; (ii) those unobservables that drove Jewish communities to certain cities differ between those territories that fell under the Spanish crown in 1504 and those that did not

- The test involves a simple interaction dummy, having divided Italian cities based on whether they had a Jewish community in 1500 and whether they belonged to a territory where Jews were allowed to reside after 1504:

  $$\log Y_i = \gamma_1 Stay_i + \gamma_2 J_i^{1500} + \gamma_3 Stay_i \times J_i^{1500} + X_i^{'}\delta + \varepsilon_i$$

  - First, the results show that the presence of Jews in 1500 in Spanish territories has no significant effect on current pc income → whatever unobservables led the Jews to establish communities in 1500 did not affect the current economic development!
  - Coefficient on the interaction term is statistically significant at the 1% and positive. Having a Jewish community in non-expelled regions leads to 11% higher income!
  - Adding a triple interaction with presence of Monte confirms that the presence of Jewish community affected current pc income only where a Monte was created!
  - These results are robust to the inclusion of: area of municipality; regional administrative capacity; size of urban population; municipality's human capital
  - Conclusion: presence of Jewish community in 1500 is only associated with higher pc income in territories where Jews were not expelled!

- A common argument is that the expulsion of Jews marked the beginning of the economic divergence between N and S Italy → conservative estimates by LP suggest that the expulsion explains at least 10% of the income gap between N&S Italy

- Next, LP establishes two channels through which the Jewish communities affected current economic development
  - (1) Impact of Monti on local banking development; (2) impact of local banks on economic performance
  - To establish the latter relationship, LP applies a 2SLS strategy on equation 4 from the system of equations, using Jewish demography as the instrument
    - We've already established instrument relevance above; now, LP argues that the instrument is exogenous

      $$Cov\left(J_i^{1500}, v_{4,\mathrm{i}}\right) = 0$$

    - LP decomposes the residual into three parts:

      $$v_{4,\mathrm{i}} = \varepsilon_i + \varsigma_{[1500,2000],i} + \varsigma_{[-\infty,1500],i}$$

    - By construction, J is uncorrelated with the first term
    - As for the second, LP emphasizes that Jews could not have had an effect on current economic performance through any other channel because they were segregated!
    - Finally, J should be uncorrelated with the 3rd component, as LP clearly outlined in the previous section with the interaction dummy
  - Results from IV: an increase in credit availability of 1% increases local GDP by 0.22%
    - These results are robust to adding geographic characteristics, province fixed effects; using size of Jewish communities as an alternative instrument
    - The effect working through branch density is much greater: 1% increase in branch density increases pc GDP by 0.7-1.2%

- The second objective of the section is to establish the causal effect of the incorporation of a Monte during the Renaissance on Italian banks today
  - LP does this by running a 2SLS regression of equation 3 from the system
  - Result: Extraordinary persistence → presence of Monte during 16th c. increases current availability credit by >100%
  - There is also a significant effect when branch density is used as the DV!
- Conclusion: Presence of a Jewish community in 1500 fostered current local banking through its effect on the development of the Monti. Furthermore, 2SLS shows that banking development has a significant and robust effect on economic performance!

- Finally, LP examines the hypothesis of Schumpeterian growth literature, which stresses the importance of banks for aggregate productivity. Three relevant steps:
  1. LP infers the productivity of each firm as the residual of an estimated production f-n
  2. Computes a measure of aggregate city productivity as a weighted average of firms
  3. Finally, studies how local banks affect the productivity measure using 2SLS
  - Result: local credit availability and branch density have a positive and significant effect on aggregate productivity!
  - Furthermore, LP analyzes two channels through which banks could affect firm productivity: (i) reallocation of capital toward more productive firms and (ii) general increase in firm productivity
    - Result of this decomposition: Over 2/3 of the effects of local banks on aggregate productivity is explained by the reallocation of resources; less than 1/3 is explained by effect on unweighted average firm productivity figures
    - The supports the Schumpeterian view!

Results:

- Level of local banking development during the Renaissance had strong causal effects on current availability of credit in Italian municipalities
- Evidence indicates that local banks had an important effect on current income!

Conclusions:

- An important implication of the paper is that improvements in financial institutions may substantially benefit the economic environment
- The paper lack a rigorous analysis of the mechanisms responsible for persistence of local banking development
- The findings do not imply that contemporary banking institutions are predetermined by local historical events and cannot be changed!

Comments & *Additional Notes*:

Title: The Colonial Origins of Comparative Development: An Empirical Investigation
Author(s): Daron Acemoglu, Simon Johnson, James Robinson
Journal: The American Economic Review
Year: 2001

Hypothesis & Relevant Questions:
- What are the fundamental causes of differences in per capita income across countries?

Area of Research & Relevant Previous Literature Historical Background:
- Institutions: secure property rights, less distortionary policies; more investment in physical and human capital
  - See North & Thomas (1973), North (1981), Rodrik (1999), Hall & Jones (1999)
- Propose a theory of institutional differences among countries colonized by Europeans
  - There werse different types of colonization policies → "extractive states" vs. "Neo-Europes"
  - Colonization strategy was influenced by the feasibility of settlements
  - Colonial state and institutions persisted even after independence
- On one hand you have colonies such as Australia, New Zealand; on the other hand you have most colonies in Latin America, Africa, and Asia
- The third pillar is the institutional persistence. This is crucial. Why do institutions persist over time, even when they are clearly not optimal
  - Institutional changes are very costly to implement. This works both ways!
  - Gains to an extractive strategy may depend on the size of the ruling elite!
  - If agents make irreversible investments that are complementary to a particular set of institutions, they will be more willing to support them
- The conclusion is that there may be two equilibria here: a good one and a bad one!
- Overall, the theory/hypothesis can be summarized schematically:

(Potential) Settler Mortality → Settlements → Early Institutions → Current Institutions → Current Economic Performance

- Use mortality rates expected by European settlers as an exogenous instrument for current institutions in these countries
- Exclusion Restriction: Mortality rates of European settler more than 100 years ago have no effect on GDP pc today other than their effect through institutional development
- Key Point:
  - Malaria and yellow fever were the major sources of European mortality in the colonies
  - However, the indigenous populations were broadly immune to these!
- Not much literature prior to this related to the link between settler mortality and institutions
- Hayek (196), La Porta (1998, 1999) have emphasized the importance of colonial origin

Data Used & Its Sources:

- Have settler mortality data for 64 ex-colonies
- Economic outcome: GDP per capita in 1995 (PPP)
  - Alternative: Output per worker in 1988 (from Hall & Jones)
- Current Institutional Variable(s):
  - Index of protection against expropriation 1985-95 → Political Risk Services
  - Alternative: Constraints on executive in 1990 → Polity III
- Measures of early institutions
  - Constraints on executive in 1900; Index of democracy in 1900
  - Countries that were still colonies in 1900 receive the lowest score → 1
  - Constraints on executive in first year of independence → alternative
- Fraction of population of European descent in 1900 → McEvedy & Jones (1975)
- Data on mortality of European settlers coms from the work of Philip Curtin
  - Most of the data available is from the 19th century
  - Second measure is annualized deaths per thousand mean strength (i.e. soldiers)
  - For South America, AJR use data from Gutierrez (1986)

Methodology & Results: ‘

- The first step is defining the baseline specification:

  $$\log y_i = \mu + \alpha R_i + X_i^{'}\gamma + \varepsilon_i \quad (1)$$

  - Y is the economic outcome, R is risk against expropriation, X is the controls
  - Result: There is a strong correlation between institutions and income pc today!
  - The correlation is robust to adding latitude control, and continent dummies, although some of the additional controls are also significant
- Despite the promising results above, we cannot treat the results as causal:
  - Reverse causality problem
  - Many omitted determinants
  - Measurement error/bias in institutional coefficients
  - All of these problems could be resolved if we had an instrument for institutions!
- AJR believe settler mortality is a plausible instrument for institutional development → it affected European settler patterns but had little effect on the health of the indigenous
- Next, AJR outline their Instrumental Variable approach. In particular, they use the following system of equations to outline their approach:

  $$R_i = \lambda_R + \beta_R C_i + X_i^{'}\gamma_R + v_{Ri}$$

  $$C_i = \lambda_C + \beta_C S_i + X_i^{'}\gamma_C + v_{Ci}$$

  $$S_i = \lambda_S + \beta_S \log M_i + X_i^{'}\gamma_s + v_{Si}$$

  - R is *current institutions*; C is measure of *early institutions*; S is fraction of colony population with European descent; M is *mortality rates* of settlers; X – *covariates*
  - Settler mortality, M, is used as an instrument for R!
  - Identification strategy is valid as long as mortality rates between the 17th and 19th centuries have no effect on income today other than through institutions!
  - AJR run each of these equations in succession → results confirm the channel

- Next, AJR examine the relationship between institutions and economic performance, using the IV strategy. The specification of this approach is:

  $$\log y_i = \mu + \alpha R_i + X_i^{'}\gamma + \varepsilon_i$$

  $$R_i = \xi + \beta \log M_i + \mathbf{X}_i^{'}\delta + v_i$$

  - The results from the 2SLS strategy is positive and highly significant. The impact of institutions on income is around 1.00. A one unit increase in average protection against expropriated in 1985-95 leads to a 171% increase in GDP per capita!
  - This results is robust to the use of a range of different samples
  - It is also robust to the inclusion of continent dummies and latitude control
  - Remarkably, the latitude variable and the Africa dummy are now completely insignificant! It seems their worse performance is driven by worse institutions!
- Next, AJR provide a series of robustness checks for their results:
  - Control for: Colonial origin; latitude; temperature & humidity; percent of European descent in 1975; soil quality; natural resources; being landlocked; ethnolinguistic fractionalization
  - In all these cases, the coefficient on the main variable of interest is qualitatively unchanged
  - Also control for malaria (i.e. disease environment), life expectancy, and infant mortality. The former two are insignificant, while the third is significant, but highly endogenous!
- Finally, AJR conduct several overidentification tests to confirm robustness
  - AJR test whether C, S, or M have a direct effect on current income pc by using measures of C and S as additional instruments in the 2SLS
  - Finally, AJR also regress income on protection against expropriation and settler mortality. The latter is insignificant, meaning settler mortality has no direct effect on income pc
  - Overall, the results show no evidence that mortality rates faced by settler have a direct effect – or an effect working through a variable other than institutions – on income pc

Conclusions:

- Findings definitely do not imply that institutions today are predetermined by colonial policies and cannot be changed
- The next important question is analyzing how exactly institutions impact income pc. What types of institutions are more important?

Comments & *Additional Notes*: