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**HISTORICAL ECONOMETRICS:
INSTRUMENTAL VARIABLES AND
REGRESSION DISCONTINUITY
DESIGNS**

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ECONOMIC HISTORY



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Abstract

This chapter surveys the usage of Instrumental Variables (IVs) and Regression Discontinuity Designs (RDDs) in economic history. I document the positive trends of economic history articles employing these methods using three different samples: top 20 journals in economics, top 5 journals in economic history and top five general interest journals in economics from 2000-2020. I detail two broad phases: seminal articles published from 2001 to 2011, and a second wave of studies refining these techniques appearing from 2012 to today (2020). I discuss some methodological refinements that have appeared recently in the econometrics field—in the IV and RDD fronts. I then present a practical guide on regression diagnostics, acknowledging that there are other useful sources of identification available to tackle potential endogeneity issues.

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Historical Econometrics: Instrumental Variables and Regression Discontinuity Designs¹

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August 25, 2020

-Abstract-

This chapter surveys the usage of Instrumental Variables (IVs) and Regression Discontinuity Designs (RDDs) in economic history. I document the positive trends of economic history articles employing these methods using three different samples: top 20 journals in economics, top 5 journals in economic history and top five general interest journals in economics from 2000-2020. I detail two broad phases: seminal articles published from 2001 to 2011, and a second wave of studies refining these techniques appearing from 2012 to today (2020). I discuss some methodological refinements that have appeared recently in the econometrics field—in the IV and RDD fronts. I then present a practical guide on regression diagnostics, acknowledging that there are other useful sources of identification available to tackle potential endogeneity issues.

I. Introduction

This chapter surveys two econometric tools—Instrumental Variables (IVs) and Regression Discontinuity Designs (RDDs)—in economic history, in what I term Historical Econometrics. For the actual history of IVs, see Stock and Trebbi (2003) and for the historical application of RDDs in psychology, statistics and economics, see Cook (2008). Along with natural experiments (surveyed in this volume by Cantoni and Yuchtman, 2020), these econometric techniques have played an important role in the modern development of economic history. In fact, I argue here that such methods have been instrumental in what Margo (2018) has called the “integration of economic history into economics.”

The usage of modern econometric techniques in economic history, did not occur in a vacuum and parallels the broader developments in economics. One essential origin can be traced back to the so-called Identification or Credibility Revolution, emanating from Labor Economics and Applied Microeconomics. Seminal papers from the IV camp of this movement include Angrist (1990), Imbens and Angrist (1994), Angrist and Imbens (1995), Angrist, Imbens and Rubin (1996), Angrist and Krueger (2001), Acemoglu and Angrist (2000) and Card (2001). Notably, some of these papers exploited sources of historical variation, coming from compulsory schooling laws and the Vietnam War lottery, though by no means were they seen as purely economic history contributions. In turn, RDDs in economics were developed, and popularized, in articles such as Angrist and Krueger (1991), Angrist and Lavy (1999), Imbens and Lemieux (2008) and Lee and Lemieux (2010). These modern econometric methods were later incorporated into

¹ Prepared for the *Handbook of Historical Economics*. I thank the editors, Alberto Bisin and Giovanni Federico for their comments and encouragement, Giovanni Federico for kindly sharing his data, participants at the 2019 book conference at NYU, Ellora Derenoncourt, Juliana Jaramillo and Nathan Nunn for comments, and Fernando Secco for impeccable research assistance. The usual disclaimer applies.

the standard economics toolkit, of any Economics PhD program, with books such as Angrist and Pischke (2008).

Economic history had also lived a revolution of its own, before the arrival of IVs and RDDs, through the advent of Cliometrics. Though a proper survey of this phenomenon is beyond the scope of this chapter (see Margo (2020), in this volume), the usage of historical data and quantitative methods for decades, paved the field for the usage of ever more sophisticated econometric techniques. The data requirements for properly computing regression discontinuities non-parametrically, for instance, remains large. Already by 2010, Diamond and Robinson argued for the usage of “Natural Experiments” from history for causal identification. Perhaps a final push in economic history came from what was termed “Historical Development” by Nunn (2014). In a pair of surveys, Nunn (2009 and 2014) stressed the importance of history for the better understanding of economic development. Nunn not only captured the state of the art in this literature, but coalesced the existing articles into a new sub-discipline. In his surveys, Nunn emphasizes the particular role of causal identification in the recent wave of economic history papers. This approach provides an important counterpoint to the Randomized Control Trial (RCT) revolution that reshaped economic development, and was recognized with the 2019 Nobel Prize in Economics. The quest for the “deep roots” of comparative economic development were later summarized by Spolaore and Wacziarg (2013), Michalopoulos and Papaioannou (2017) and Nunn (2020). This volume offers a new synthesis of knowledge, of a rapidly evolving field.

As opposed to the comprehensive articles just mentioned, the chapter at hand is meant to be more illustrative in terms of econometric methodologies—focusing on IV and RDD methods. To this end the rest of the article is organized as follows. In the next section, I discuss the problem of econometric identification, as it relates to economic history. Next, I review some of the main trends in the economic history literature in terms of econometric methods. I then describe individual papers, and how they tackled key identification challenges, dividing them between the pioneering studies and a more recent “second wave” of papers. More technical sections discuss recent refinements in the IV and RDD camps, with the idea of providing some potentially useful tools and practical guide for researchers in the field. I offer some concluding thoughts along with potential avenues for future research.

I. Identification in Economic History

Identification plays a special role in modern economic history. Many studies, especially those related to historical persistence (surveyed by Voth, in this volume), are aided by the arrow of time. It is essentially impossible to have reverse causality, from an event occurring in the future to an event that happened in the past. This is not to say, that there could still be *other* econometric threats to identification, such as measurement error and omitted variable bias. The first could be especially relevant for historical studies, where data can be spotty, inaccurate and in many cases, simply missing. Omitted variables, in turn, might be correlated with a given historical determinant, that can still drive modern outcomes today. These can include geographic and weather characteristics, as well as other historical episodes, including events that occurred in the periods between the main historical event of interest and the current time. This “compression of history” is perhaps the main criticism of persistence papers, coming from the economic history field (Austin, 2008). To be fair, economists and economic historians are well aware of many of these issues and are now rather trying to better understand when persistence occurs, and why (see, for instance, Giuliano and Nunn, forthcoming).

Identification issues have been tackled in various ways in the recent literature. Historical variation can be simply taken as given, as the persistence of a given trait is established. Notably, this has been shown for cultural traits such as trust (described later) and antisemitism in Germany, from medieval to Nazi times (Voigtländer and Voth, 2012); but also in documenting the persistence of human populations from ancient to modern times (Davis and Weinstein, 2002; Chanda et al., 2014; Maloney and Valencia Caicedo, 2016). In other cases, researchers have studied “Natural Experiments” from history for identification. Diamond and Robinson (2010) provide a pioneering summary of this approach, and Cantoni and Yuchtman (2020) survey the more recent contributions to this agenda in this volume. Though the specific policies and events are diverse, the European colonization of vast swaths of land, often provides a plethora of natural experiments in terms of legal and political regimes, labor arrangements, religious, military and medical campaigns (see Nunn, 2020).

Lastly, economic historians have recurred to standard econometric tools, such as Instrumental Variables and Regression Discontinuity Designs for identification—which is the focus of this chapter. I make here the distinction between IVs and RDDs for organization purposes, as econometrically fuzzy RD is equivalent to IV estimation. For IVs the main identification assumptions are relevance (strong first stage), excludability (the effect is working through the regressor of interest only) and monotonicity (compliers move in the “right” direction). Though the first one is relatively easy to test, the other two are less so, with some technical exceptions (Huber and Mellace, 2015; Kitagawa, 2015). For RDDs, the precise assumptions differ between fuzzy and sharp designs, but essentially the discontinuity in the running variable should be accompanied by smooth covariates (not “jumping” at the given threshold). There should not be any bunching at the threshold either, which I discuss further later. Under these assumptions, these methods allow for the recovery of a Local Average Treatment Effect (LATE). So even under this ideal scenario, IVs and RDDs do *not* recover an Average Treatment Effect (ATE). This is an important limitation, not only in terms of inference, but also interpretation (see, for instance the critiques by Heckman, 1999 and Deaton, 2010). IVs and RDDs are by no means the only available econometric techniques available to researchers in the field, which also include differences-in-differences, placebos, randomized controlled experiments and propensity score matching. Still, as this chapter shows, the progress made with IVs and RDs has been substantial, leading to important insights, and holds promise for the other methods as well.

II. General Trends: 2000-2020

In order to see the evolution of IV and RD papers in economic history, I use three different empirical vantage points. The first is a dataset containing all the articles in this discipline in top 20 general economic journals, none of which include economic history journals. The second one looks at articles in the top five economic history journals, employing “advanced econometric methods”, as compiled by Cioni et al. (2020). The third one looks at articles published in economic history, using IV and RDDs, in the top five economics general interest journals. All of these datasets take into account approximately the last 20 years of research production, starting in 2000.

A first way to see the evolution of Instrumental Variables and Regression Discontinuity papers in economic history is presented in Figure 1. The figure plots the number of papers in this field in top twenty general

interest journals (according to Ideas) employing these techniques from 2000 to 2018.² A five-year moving average is used to smooth the data.³ We can see some of the first papers in the discipline employing Instrumental Variables appearing at the beginning of year 2000 and how this number increases to more than five papers a year in 2018 (blue line). The evolution of Regression Discontinuity papers (orange line) in economic history starts almost a decade later, around 2008. It reaches two papers per year at the end of the sample period. By 2018, there are on average ten IV and RD economic history papers (the actual number is 11) published in the discipline's top twenty most prestigious journals. In total, there are almost a hundred such economic history papers published in these top outlets during the last two decades. The positive trend mimics that documented by Abramitzky (2015), of economic history papers increasingly addressing causal questions.

Figure 2A provides another way to see a similar pattern to the one just shown. Now the figure plots the number of papers in the top five field journals in economic history employing "advanced econometrics". The top five journals are the *Economic History Review*, the *Journal of Economic History*, *Explorations in Economic History*, the *European Review of Economic History* and *Cliometrica*. This allows us to see the evolution of econometric techniques from within the field, covering the period from 2001-2018. In this case the definition of "advanced econometrics" is more ample and now also includes differences in differences, panel regression, propensity score matching, vector auto regression and vector error correction models.⁴ As before, we use a five-year moving average to smooth the data (a three-year moving average leaves the results unchanged). Despite the broader definition, the pattern remains clear, the number of papers in economic history using more sophisticated econometric techniques goes from almost zero (literally zero in 2002) at the beginning of the 2000s to more than twenty papers a year, almost twenty years later. Cioni et al. (2020) note that the first paper with Instrumental Variables in their data, by Newell, appeared in 1973. The higher number of papers, might be due to the fact that now other techniques are included, as well as the potentially larger number of papers published in these field specific journals.⁵ To correct for this possibility, Figure 2B plots the percentage of papers in economic history using advanced econometrics over the total number of papers in economic history journals. This rate goes from 0% at the beginning of the 2000s to almost a sixth by 2018. The number is much higher, reaching 40%, when looking at the sub-set of papers using Econometrics (Figure A.1). Altogether, the recent upward trajectory of articles employing advanced econometrics is also clear from using this alternative dataset.

One last way of seeing the evolution of IV and RDD papers in economic history is by looking at publication in the "top five" economic journals in Economics. These are the *Quarterly Journal of Economics*, the

² These are, ranked, the *Quarterly Journal of Economics*, *Journal of Political Economy*, *American Economic Review*, *Econometrica*, *Journal of Economic Literature*, *Journal of Financial Economics*, *Review of Economic Studies*, *Journal of Finance*, *Journal of Monetary Economics*, *Journal of Economic Growth*, *Journal of Economic Perspectives*, *Review of Financial Studies*, *Journal of Econometrics*, *Review of Economic and Statistics*, *Journal of Labor Economics*, *AJ: Macroeconomics*, *Journal of International Economics*, *Economic Journal*, *Journal of Public Economics*, *Brookings Papers on Economic Activity*. Own calculations.

³ Technically, the sample starts earlier, to be able to calculate the moving average. But given the practical absence of articles before the 2000s, the results remain virtually unchanged. Using a three-year moving average instead, leaves the results almost unchanged, not shown.

⁴ I thank Giovanni Federico from making available this data. The definition was not disaggregated further in this case. Please see Cioni, Federico and Vasta (2020) for more details on this data, also this volume, Chapter X.

⁵ For comparison, about 100 articles are published per year in these five journals, whereas, the average number of articles in economic history in the top five general interest journal described next was slightly below twenty.

Journal of Political Economy, the *American Economic Review*, *Econometrica*, and the *Review of Economic Studies*. Abramitzky (2015) already documented a positive trend of economic history publications in these journals. Articles are selected here if they report using one of the *Journal of Economic Literature* codes for economic history (category N). The sample is further restricted to papers that include the words or expressions “instrumental variables”, “instrument” or “2SLS” for this econometric technique. For regression discontinuity, this same word is used, along with “discontinuity”, “discontinuities” or “RDD” at least once. Finally, we manually checked the context in which the words were used, differentiating between a mention in passing of such words, for instance referring to another article, or the actual usage of these estimation methods for identification.⁶ Only the latter were kept in the final dataset and are presented in Tables 1 and 2. Papers that used IVs mainly for robustness are presented in the Appendix (Table A.1). This might be an indication that the endogeneity problem was not that severe in those cases. Interestingly, there are no papers that employ RDDs only for robustness. Overall, there are almost fifty papers employing Instrumental Variables for identification in Table 1 and around one fifth of that number using Regression Discontinuity. Only very few papers employ both techniques. Though this table serves as primary reference to IV/RDD studies in economic history, I describe specific studies in more detail next.

III. *First Generation Studies: 2001-2011*

Some of the first articles to use Instrumental Variables from history in economics were the seminal institutional pieces of Acemoglu, Johnson and Robinson (2001 and 2002).⁷ To better understand the importance of these articles and how they coalesced existing knowledge in various fields of economics, see Cantoni and Yuchtman (2020, this volume). The main identification concern in this set up is that institutions could be endogenous to income, as famously argued by Lipset (1959). To get around this challenge, the authors instrument institutions using a measure of settler mortality in former colonies. The idea is that European colonizers established different institutions depending on their likelihood of survival in various places. Colonies with worse disease endowments led to the establishment of more extractive institutions, while those with better endowments led to settler colonies with more favorable regimes, as argued by Engerman and Sokoloff (1997). Acemoglu, Johnson and Robinson document a robust negative first stage in the relationship between the logarithm of settler mortality and average expropriation risk from 1985 to 1995. In the second stage, they find a large (causal) impact of this institutional measure on GDP per capita in 1995. These influential set of articles helped put institutions at the center stage of economics, and also gave a boost to the economic history field.

As is often the case with major intellectual contributions, Acemoglu, Johnson and Robinson (2001 and 2002) have also received scholarly attention scrutinizing some of their findings. I discuss here some of the main criticisms and threats to identification, as they related to identification in an IV context. An obvious confounder is the direct impact of geography through the disease environment on income (see Gallup and Sachs, 2011; Sachs and Malaney, 2002). Aware of this potential issue, Acemoglu, Johnson and Robinson (2001) show that their estimates are robust to controlling for malaria prevalence and various indicators of health. In a comment, Albouy (2012) questions the validity of the settler mortality data,

⁶ I gratefully acknowledge the work of Fernando Secco in constructing this dataset. Papers are technically until 2019, as 2020 and forthcoming papers are not yet included in EconLit.

⁷ For an earlier example of instrumental variables not coming from history, to study global differences in productivity, see Hall and Jones (1997).

raising issues of interpolation and, potentially, selection. Acemoglu, Johnson and Robinson (2012) provide their own response to these criticisms and restate the robustness of their results. Glaeser et al. (2004) employ the same settler mortality instrument for their preferred measure of human capital (years of schooling). Beyond econometrics, their point is that it is hard to disentangle whether the effect of colonizers is working through institutions or education: what they brought with themselves. Easterly and Levine (2016) look instead at the direct impact of European settlement on development, expanding on the settler mortality variable. They find a finding a positive relationship between early European settlements and subsequent growth. It is fair to conclude that settler mortality is by now one of the most famous—and hotly contested instruments—employed in economic history.

Guiso, Sapienza and Zingales (2016) constitutes a seminal piece in the cultural economics literature.⁸ In it the authors take Robert Putnam seriously and investigate whether social capital can be a driver of economic performance. The key idea is that self-governing cities, mostly in the North of Italy, perform better institutionally and economically because of their underlying social fabric. To instrumentalize this notion, the authors collect data on non-profit organizations, organ donations and cheating in math exams. They find that areas within Italy that have been independent for longer have higher social capital and are more financially developed (see also, Guiso, Sapienza and Zingales, 2004). Because the first variable might be endogenous, the authors instrument it with Bishoprics and the presence of Etruscan settlements. The findings for Italy have been extended for regions in Europe (Tabellini, 2010) and across the globe. For instance, Algan and Cahuc (2010), use the inherited trust of migrants to the US to conclude that trust *causes* growth. Guiso, Sapienza and Zingales (2016) not only vigorously advocated for the importance of culture for economic performance, but also helped initiate the so-called long-term persistence literature.

In another important institutional paper, Banerjee and Iyer (2005) exploit historical variation from colonial India. In their analysis they look at the legacy of historical land tenure patterns, differentiating between landlords and cultivators. In particular, they compare areas, within the country, where the British took over tax collection from 1820 to 1856. These areas resulted in higher prevalence of non-landlord systems. They find that such systems led to higher agricultural investment and productivity. They also find that landlord areas have lower health and education levels today. In a similar vein, Iyer (2010) looks at the long-term impact of direct versus indirect colonial rule in India. She finds that territories that experienced direct rule during colonial times have lower access to schools, health facilities and public roads in modern times.⁹ These papers provide concrete within country evidence about the role of European colonialism in Asia, complementing previous cross-country studies.

Focusing on Latin America, in a landmark study, Dell (2010) looked at the long-term impact of the *mita* colonial labor system in Peru and Bolivia. This mining tribute system, existed in the Andean region from 1573 to 1812. The author exploits econometrically the specific boundaries of the *mita* catchment area. To this end, Dell employs a geographic Regression Discontinuity Design, the first of its kind in economics. Hence this paper was an important contribution not only in economic history and the institutional economics literature, but also methodologically. Employing this new econometric technique, on household surveys, Dell finds that the *mita* significantly reduced consumption and increased stunting in modern times. In terms of mechanisms, she looks at land tenure (*haciendas*), public good provision and

⁸ I include this article in the first wave, since even though it was published in 2016, the widely circulated and cited working paper version is from 2008.

⁹ In another famous piece, Jha (2013) looks at how trade and institutions related to ethnic tolerance in India.

sectoral composition. It is surprising that the effects persisted, even though the *mita* as an institution has been long abolished. As will be discussed later, this initial geographic RDD has been refined econometrically in different ways.

In turn, Nunn (2008) and Nunn and Wantchekon (2011) empirically test whether Africa's regional development patterns could be partly explained by transatlantic slavery. The authors use shipping records and match them to the original ethnicities of slaves, using Murdock's 1959 map.¹⁰ As instruments for shipments, they use distance to the coast and sailing distances to the nearest slave ports. Nunn (2008) finds that indeed, countries where more slaves were taken from are significantly poorer today. In terms of mechanisms, Nunn and Wantchekon (2011) find that this is mainly due to decreased trust. For this they use geo-located individual level data from the Afrobarometer. In terms of transmission channels, they stress cultural norms, beliefs and values. These influential papers helped cement the importance of economic history for explaining current (under) development, as well as the usage of standard econometric techniques in the economic history field.

In the culture and religion realms, Becker and Woessmann's (2009) testing of Max Weber's hypothesis represented a watershed in the usage of instrumental variables in economic history. A key question in this paper is whether Protestant areas do better economically than Catholic ones. To answer it, the authors focus on Prussia and use data from the 1871 census. The key problem here is that religion could be endogenously chosen, so regressing Protestantism directly on income could lead to biased estimates. To solve this problem, they use the concentric spread of Protestantism, emanating out of Wittenberg, where Martin Luther posted his famous 95 theses in 1517. Using this instrument, the authors find a causal, positive impact of Protestantism on proxies for income in 1871. Furthermore, in a 3SLS framework the authors find that literacy is the main channel of transmission of the religion to income effect.¹¹ Meaning that Protestant areas are indeed richer, but that this is due to the fact that they invested heavily in education, in accordance to the new religious doctrines. In the paper, the authors explore the exogeneity of the instrument and provide some bounds for their baseline estimates. Econometrically, Becker and Woessmann (2009) helped propel the usage of distance-based instruments in economic history.¹²

In a similar econometric vein, Dittmar (2011) quantified the economic impact of the printing press, one of the most important technological innovations in history. As before, the main challenge in terms of identification is that the adoption of new media could be endogenous to economic growth, responding to demand and not just supply considerations. To get around this issue, the author exploits the fast spread of the printing technology, originating from Johannes Gutemberg's workshop in Mainz, in 1440. Using distance to Mainz, as an instrument for the adoption of printing, Dittmar finds a positive and sizable effect on subsequent population growth of European cities. Importantly, this effect is not present from 1450 to 1500, but kicks off after this later year. Relating his findings to Becker and Woessmann's (2009) piece, Dittmar (2011) finds no effect of distance to Wittenberg on the adoption of the printing press. Following this line of argument in the opposite direction—and using distance to Mainz as an instrument—Rubin (2014) finds a positive impact of the printing press on the spread of Protestantism.

¹⁰ Digitizing this map was an important contribution in it of itself, which has led to many articles in economics, some of them summarized later in this chapter.

¹¹ To the best of my knowledge, this is one of the only papers to employ 3SLS in the economic history literature. For an alternative view of the Weberian effect see Cantoni (2015) and for the cultural channel, Spenkuch (2017).

¹² For a more recent application, see Becker and Pascali (2019).

Lastly, Ashraf and Galor (2013) advance and empirically test the hypothesis that genetic diversity is a pillar of comparative economic development. The problem with this genetic measure is that it could be endogenous to income, due, for instance, to historical waves of migration. To get around this problem, they look at the first wave of migration in human history, that of *Homo sapiens* out of Africa. Due to a serial founder effect, the farther away a human population is from Addis Ababa, Ethiopia (the cradle of humankind) the lower its genetic diversity. Using this first stage, the authors are able to predict levels of genetic diversity for countries where ancestral population genetic data is not available. Employing this instrument they find a hump-shaped relationship with income, reflecting how low levels of genetic diversity are bad for innovation, while high levels can foster conflict (Arbatlı et al. 2020 expand on this second dimension). The optimal level of diversity, according to the authors, corresponds to that of Japan in 1500 AD and the United States in 2000, adjusting for later waves of migration (following Putterman and Weil, 2010). This important—and provocative—article put genetics in the center stage of the debate on the “deep rooted” causes of growth. As other articles covered in this section, it was a seminal piece in the genetics and economics field, just as other contributions covered in this section helped to jumpstart the economic literatures on institutions, culture, religion, human capital and technology.

IV. *A Second Wave: 2012-2020*

A “second wave” of papers in economic history appeared during the second decade of the twenty first century, employing ever more sophisticated econometric techniques. I showcase here some emblematic examples, which are meant to be more illustrative in capturing the zeitgeist. Though still employing Instrumental Variables and Regression Discontinuity Designs, the papers covered next enhanced these methods, alleviating concerns of excludability and identification more generally. Recall that it is precisely during this time period that we saw an acceleration in the publication of economic history papers in some of the top economics journals (a trend echoed in Margo, 2018 and Abramitzky, 2015).

A good illustration of the second generation papers are the series of articles by Michalopoulos and Papaioannou (2013, 2014 and 2016). Though they look at different outcomes separately, the key identification strategy holds across the three studies. Historically, they exploit the haphazard redrawing of African national boundaries, resulting from the scramble for Africa. When European representatives met during the 1884-1885 Berlin conference, they established new borders for Africa that obeyed more their own colonial interests than the traditional pre-colonial ethnic boundaries, which had been developed for centuries. Econometrically, this leads to a two-way partition of space: one coming from the ethnic homelands mapped by Murdock and another from the newly drawn national boundaries for Africa. The authors argue that this second partition is “exogenous” and could have had long-term consequences. Using a Regression Discontinuity Design, they find three important results. First, *precolonial* ethnic homelands are important predictors of contemporary economic development, as proxied by nightlights (Michalopoulos and Papaioannou, 2013). Second, *national* borders or institutions are less important predictors of economic prosperity in the African continent (Michalopoulos and Papaioannou, 2014). And, third, partitioned ethnicities resulted in higher levels of conflict later on (Michalopoulos and Papaioannou, 2016). These three papers all employ an RDD to establish causality. To the best of my knowledge, no other paper has yet exploited such a two way partition of space in economic history.

On the IV front, Alsan (2015) studies the impact of the TseTse fly on African development. It has long been hypothesized that this disease could be another cause for African underdevelopment, but no one had

empirically tested this claim. Again, the problem is that the TseTse fly could be endogenous to other correlates of income, such as weather characteristics. To instrument for the presence of this insect, Alsan develops her own suitability index, using models from entomology. This novel approach follows a well-established literature of using other types of suitabilities as instruments, reviewed in the next subsection.¹³ She finds that the fly, which affects animals more than people, results in lower usage of animal husbandry. Moreover, this led to less precolonial political centralization, an important institutional variable, following the studies reviewed above.

In the political economy arena, Adena et al. (2015) look at the role of the media in supporting democratic institutions. The authors focus on Weimar Germany during the 1920s and 1930s. They use the radio, which was a key mass media technology at the time. Because access to this technology is potentially endogenous, they use as instrument radio signal strength (following Stromberg, 2004). With this instrument, they find that the effect is positive during the democratic period, but that when the Nazis came to power, the same communication technology was used as propaganda. A similar identification strategy has been used by Gagliarducci et al. (forthcoming) during WWII in Italy with BBC radio. This identification strategy, using radio signals, has also been used in other contexts—in political economy and the economics of mass media.

In the conflict space, Dell and Querubin (2018) examine the impact of bombing and counterinsurgency operations in Vietnam. Since bombing is a strategic (and costly) choice, they use two different identification strategies to estimate its causal effect. In particular, they use rounding thresholds in the algorithm used to target air strikes. This is almost an ideal instrument in terms of exogeneity and excludability. Moreover, they exploit a spatial discontinuity design on the types of American counterinsurgency operations: predominantly firepower versus “hearts and minds”. Armed with these tools, they find that bombing increased anti-American sentiment, both politically and militarily. This paper is also novel econometrically, as it employs two different types of identification strategies (IV and geographic RDD) to empirically test their claim.

The historical international trade literature has also experienced a revival in terms of modern econometric techniques. A good example of this is Pascali’s (2017) work on the introduction of the steamship during the first wave of trade globalization (1870-1913). What is key in this paper, in terms of identification, is that the new technology reduced transportation costs differentially across the globe. Pascali builds an instrument based on wind patterns to calculate optimal routes.¹⁴ The author finds that the expansion of trade led to *negative* economic outcomes for most countries. Only a few countries with good institutions were able to profit from the trade boom, exacerbating global economic divergence.

Also in the trade field, Juhasz (2018) exploits a natural experiment to empirically test the validity of the infant industry argument—whereby governments provide temporary protection to crucial industries. Namely, she analyzes the Napoleonic blockade of 1803-1815. The confrontation with the United Kingdom generated a trade shock to France, effectively providing protection to incipient spinning industries. The author uses this shock as an instrument for the post-blockade location of the cotton industries. She finds

¹³ Technically, she reports a reduced form approach, given the lack of historical data on TseTse presence, so we exclude the paper from Table 1 and present it in Table A.1. only.

¹⁴ This paper can be seen as a more modern version of Feyrer and Sacerdote (2009), who first employed wind as an instrument for colonization, covered later.

that the temporary shock changed the structure of textile production in the long run, providing a tangible case where (unintended) infant industry protection coming from conflict was largely effective.

In a follow up paper, Juhasz and Steinwender (2019) focus instead on communication technology and fragmented production chains. The idea is that some products are more easily “codifiable” than others (yarn vs. printed clothes), and hence would benefit differentially from new communication techniques such as the introduction of the telegraph.¹⁵ Since the adoption of this technology is itself endogenous, the authors use submarine ruggedness as an instrument, which is both relevant and presumably excludable. They estimate a Poisson IV model and find that communication improvements enhanced upstream production (of yarn) and increased fragmentation. These last three papers have in common that they combine key historical variation to study important trade questions, aided with modern econometric techniques. Arguably the construction of the different instruments makes these contributions stand out from previous work, to reach at causal evidence on long-standing debates in the literature.

Lastly, in a recent contribution, Becker et al. (forthcoming) examine the link between forced migration and human capital (for a summary of this topic see Becker and Ferrara, 2019). They focus on former Polish territories after World War II, when Poles and Germans were forced to migrate, with the redrawing of national boundaries. In particular, they exploit the borders of the Kresy territories, where Poles were forced to move out due to the Soviet occupation. Migrants resettled in the newly acquired Western Territories, where Germans had been previously expelled. Zooming on the border, and using a spatial RDD, they find that forced migration resulted in one extra year of schooling. These results speak to the portability of human capital investments, and preference towards them, which they test using a household survey. Again, what stands out in this recent paper is not a new method (RDD) as such, but a clean employment of this technique to answer a meaningful economic question, in a historical context.

A. *Classes of Instruments*

Having covered numerous papers, it might be helpful now to categorize now certain classes of instruments in other notable studies. As in some of the articles previously mentioned, later contributions have used *geographic* instruments such as distance (Naidu and Yuchtman, 2013), proximity to rivers (Bai and Jia, 2016), and the slope of the terrain (Ashraf et al., 2018). Other researchers have focused on *weather* characteristics such as wind (Feyrer and Sacerdote, 2009), rainfall (Dell, 2012) or temperature shocks (Franck and Michalopoulos, 2017). Others have used different types of *suitability*, be it agricultural (Nunn and Qian, 2011; Alesina, Giuliano and Nunn, 2013), or marine (Dalgaard et al. 2015). Some papers have further decomposed these agricultural measures, looking at the interaction with heavy soils (Caprettini and Voth, 2018) or the relative values for different crops (Lowe and Montero, 2018). Chen, Kung and Ma, (2019) use a fully *interactive* instrument, looking at the combination of different forests (bamboo and pines). Following the migration literature, some papers have used Bartik type instruments in historical contexts (most notably, Karadja and Prawitz, 2019; Buchardi, Chaney and Hassan, 2019, Nunn, Sequeira and Qian, 2019, and Tabellini, 2020).¹⁶ Others have exploited econometrically variation coming from expulsions and ethnic minorities, as in the case of Waldinger (2010 and 2012), Moser, Voena and

¹⁵ Though not exactly an IV or RD paper, this joint contribution follows the earlier article by Steinwender (2018) documenting the drop of the price dispersion between the UK and the US after the advent of the telegraph.

¹⁶ In such studies, measures for larger units (such as state) or historical aggregates are used to predict those for smaller ones (such as counties) or modern times (see Goldsmith-Pinkham, Sorkin and Swift, 2018 for a survey).

Waldinger (2014), Hornung (2014) and Pascali (2016). Many of these papers are referenced in Table 1, along with a short description of the instrument used.

B. Other Regression Discontinuity Designs

On the regression discontinuity front, scholars have used variation coming from imperial boundaries, battlefronts, pre-colonial boundaries, colonial partitions and assignment thresholds. Though not exactly an RDD, Becker et al. (2016) exploited imperial boundaries to show that corruption is lower today in areas that were historically controlled by the Habsburgs. More recently, Dell, Lane and Querubin (2018) use divisions between the Dai Viet and the Cambodian Empire within Vietnam, to show the long-term impact of state centralization. In the conflict arena, Fontana, Nannicini and Tabellini (2017) use the Gothic line to look at political extremism in Italy and Tur-Prats and Valencia Caicedo (2019) exploit the Aragon Front to look at voting behavior in Spain. In terms of pre-colonial boundaries, Lowes et al. (2017), study political centralization in the Kuba Kingdom, Lowes (2018) analyzes spousal cooperation in the matrilineal belt, and Moscona, Nunn and Robinson (forthcoming) show the roles of clans in conflict. Studying colonial times, Dell and Olken (2020) use a spatial discontinuity design to measure the impact of the Dutch cultivation system in Java, and Lowes and Montero (2018) the negative long-term effect of rubber concessions in the Belgian Congo. More recently, Montero (2018) exploits an acreage threshold in the 1970s Salvadorian land reform to study the impact of cooperative property rights. Several of these papers are still working papers, recent job market papers or forthcoming in general interest journals. Though hard to predict—based on the existing trend—the eventual publication of these pieces would increase the number of RDD papers in economic history in top economics journals, perhaps even relative to IV articles.

V. Technical Refinements and Regression Diagnostics

A. Instrumental Variables

Since the time of writing of some of the papers described so far, there have been some technical refinements in the econometrics literature, which provide potentially useful tools for economic history. One example of that is the work on Plausibly Exogenous instruments by Conley, Hansen and Rossi (2012). In this paper, the authors depict a tradeoff for instruments between relevance and exogeneity. Given this fact, they then present some bounding corrections for second stage estimates.¹⁷ Since in many cases instruments from history might not be entirely excludable, this could be a useful tool for such studies, though it applies more broadly to other set-ups.

Focusing on functional form, Dieterle and Snell (2016) examine non-linear misspecification in two stage models. They suggest using non-linear first stages, employing emblematic examples from the economic history literature, such as Acemoglu, Johnson and Robinson (2001) and Becker and Woessmann (2009), described here. One paper employing this newly suggested method is Riaño and Valencia Caicedo (2020) to instrument for the strategic bombing of Laos. Antoine and Lavergne (2019) suggest using instead a more generalized “Integrated Conditional Moment” for non-linear instruments. Casey and Klemp (2020) propose an econometric IV model, which is precisely geared towards estimating causal effects in the long

¹⁷ Dippel et al. (2017) propose a mediation tool for instrumental variables.

run—when the outcome of interest is available at different points in time. Using a canonical example from the institutional literature, this correction leads to smaller, but more reliable estimates.

Perhaps one of the most promising, and increasingly popular, method is the usage of LASSO for control variables and instrument selection (Belloni Chernozhukov and Hansen, 2014). A recent application of this method is Derenoncourt (2019).¹⁸ In her job market paper, the author analyzes the Great Migration from the US South to Northern American cities during the 1940s. Derenoncourt uses a Bartik-type instrument, as is standard in the migration literature, but crucially improves the prediction of the second stage, using LASSO to select the relevant variables. With this correction, she finds that this massive internal migration wave led to *less* upward mobility in destination counties, especially for black men, potentially via racial segregation and urban decline. This paper is a good example of the forefront of the economic history literature. See also Bisin and Moro (2020, this volume) for a more in-depth discussion of these issues.

B. Regression Discontinuity Designs

In the RDD camp a series of technical refinements have also followed the publication of the seminal papers in the literature. Perhaps the most important advances have been a set of papers on non-parametric RDDs, local randomization and optimal bandwidth selection by Calonico, Cattaneo and Titiunik (2014), Cattaneo, Titiunik and Vasquez-Bare (2016), and Calonico, Cattaneo and Farrell (2020), respectively. Such non-parametric estimation methods have been used widely in the economics literature and are making inroads into economic history, even in the geographic discontinuity designs, enhancing the original method introduced by Dell (2010). There has also been a discussion about the usage, or not, of polynomials in the parametric framework. Gelman and Imbens (2019), argue that higher-order polynomials should *not* be used in RDDs, contradicting previous practice. Card et al. (2018) further explore the problem of local polynomial order in RDDs.

Barreca et al. (2011), in turn, employ a Donut RDD to address the problem of sorting on thresholds in the context of low birthweight. They then propose a way to go around one of the most common pitfalls in RDDs. In Fujiwara, Laudaes and Valencia Caicedo (2020) we use this method to look at the impact of the Tordesillas Treaty between Spain and Portugal, on the prevalence of slavery and modern-day income inequality in Brazil. Our usage of this method arises from the uncertainty arising from the implementation of this landmark treaty on the Portuguese and Spanish colonies in the Americas.

Card et al. (2016) propose a Regression Kink (RK) Design identifying off changes in slopes, even if the running variable has no discontinuities.¹⁹ Though this is by now a fairly standard method in labor economics and public finance, to the best of my knowledge, the only paper in economic history employing this method so far is Milner (2019). In his job market paper, on the 1870 Education Act, Milner employs a RK Design at the 1/6 children population threshold that was used to assign school boards. He finds a significantly positive and statistically significant effect of 13.5% of new schools on high-skilled occupations. This econometric refinement holds promise for economic history, in cases where discontinuities might be less apparent.

¹⁸ Maloney and Valencia Caicedo (2017) use instead LASSO for the selection of controls, refining the Land Grant Colleges education instrument for the technical training of engineers.

¹⁹ This framework can also be implemented non-parametrically, with the `rdrobust` command in Stata. The command also allows for the option of using the alternative “IK” bandwidth selector of Imbens and Kalyanaraman (2012).

C. Regression Diagnostics: A guide to Practice

I provide in this section some regression diagnostics, as a practical guide for identification in economic history. This is by no means an authoritative set of instructions, but exemplifies some common identification problems and provides some (potentially) useful solutions. Perhaps the most basic form of identification, comes from controlling for observables. Though usually not the ultimate econometric specification, a basic correlation between the variable of interest with controls, goes a long way in at least knowing where some of the potential biases might emerge from, and provides a good baseline comparison for better identified estimates. In some cases, OLS and IV estimates even change sign! To test more formally whether coefficients are stable when controls are added, one can further use Altonji / Oster ratios (Altonji, Elder and Taber, 2005; Oster, 2019). This is a good way also for testing for the potential role of unobservables in biasing the results. For some notable applications, see Bellows and Miguel (2009) and in economic history, Nunn and Watchenkon (2011). In many cases, fixed effects can soak variation coming from national factors or state level policies (see Maloney and Valencia Caicedo, 2016 and 2017). Short of identification, using this estimation method could at least narrow the potential set of confounders by investigating within country or state variation.

If the IV route is taken, one would want to test the validity of the instrument, where the usual rule of thumb is an F-statistic of more than 10 (Stock and Yogo, 2005). For the actual estimation, 2SLS is often implemented, though LIML could offer some advantages (for jackknife IV estimation, see Angrist, Imbens and Krueger, 1999). In practice, in many cases the IV estimates end up being larger than OLS estimates. This could happen for many reasons, such as the fact that only LATEs and not ATEs are recovered (Imbens and Angrist, 1994). In other cases, instruments might be weak, which is an active area of study in econometrics (surveyed recently by Andrews, Stock and Sun, 2019). One might also want to look at the “reduced form” effect—directly regressing the instrument on the outcome of interest—as is often done in labor and education economics. If more than one instrument is available, it is helpful to use over identification tests, such as Sargan. Still, IVs are no panacea, as there might be a violation of the exclusion restriction. Becker (2016) provides a good econometric guide to practice for IVs to establish causality.

In the RDD front, perhaps the best guides to practice are provided by Imbens and Lemieux (2008) and Angrist and Pischke (2008). They cover topics such as sharp versus fuzzy designs, bandwidth selection and estimation. One might want to conduct a McCrary test to see if there is sorting on the threshold (for actual bunching estimation, exploiting this feature of the data, see Kleven, 2016). It is also standard and advisable to test whether other covariates are smooth or also jumping at the threshold. Aside from some of the technical refinements already covered (non-parametric estimation, optimal bandwidth and local randomization) other tools such as line segment fixed effects and simulations have been employed. Yet another econometrics literature has focused on standard errors, for the state of the art, see Colella et al. (2019). Overall, IVs and RDs are a constantly evolving field in econometrics, often bringing useful tools for researchers in economic history and other fields.

D. Other Sources of Identification

Before concluding, it is important to note that even though this chapter focused on IVs and RDDs, these are clearly not the only tools available for identification in economic history (and economics as a whole). I only provide some illustrative examples here. In a classic study, Ciccone and Hall (1996) looked at the role of economic density for productivity. To instrument for the first, they used population density in the

1850s. Given the later persistence literature, simply taking a lagged variable as instrument now presents challenges in terms of potential threats to the exclusion restriction. The instrument could still be valid, but working through ways other than the intended channel of interest. In many cases, researchers have found placebos and natural experiments from history, which often provide quasi experimental variation to test economic theories. For instance, history often provides some placebos or at least relevant control groups (Belloc, Drago and Galbiatti, 2016; Valencia Caicedo, 2019; Angelucci, Meraglia and Voigtlander, 2020). As mentioned before, other papers have used standard econometric techniques such as differences-in-differences, neighborhood fixed effects, matching and synthetic controls (see, for instance, Dell and Olken, 2020). Though it is often hard or plainly impossible to use Randomized Control Trials (RCTs) in history, some economic history papers have complemented their findings using lab-in-the-field experiments (surveyed by Lowes (2020), in this volume). With the advent of census linking and the wider availability of data sources, many papers have opted to describe some broad and important patterns in the data. Notably, this can be seen in the study of inequality and historical finance (Piketty, 2014; Schularick and Taylor, 2012). These papers take Shiller's (2017) narrative economics approach seriously. One such case in economic history is Michalopoulos and Xue (2019). It is not only the case that other econometric approaches are valid, but that sometimes the endogeneity problems are not as severe to merit an identification strategy altogether.

VI. Concluding Remarks

This chapter surveys the usage of Instrumental Variables and Regression Discontinuity Designs in economic history, in what I term "Historical Econometrics", paralleling the title of this handbook. I argue that it is in part due to the appropriate usage of these methods that some economic history papers were successful in terms of publication venues and became influential in the broader economics literature. I document the positive trends of economic history articles employing these methods using three different samples: top 20 journals in economics, top 5 journals in economic history and top five general interest journals in economics. I detail two broad phases: 1) pioneering articles appearing from 2001 to 2011, which became seminal contributions in their respective literatures and 2) a second wave of studies refining these techniques appearing from around 2012 to today (2020). I also discuss some methodological refinements that have appeared more recently in the econometrics field in the IV and RDD camps. I then present a guide to practice with respect to regression diagnostics, acknowledging that there are other useful sources of identification such as differences-in-differences, placebos, randomized controlled experiments and propensity score matching.

Having concluded this summary, it seems that the time was ripe for writing such a survey piece. This due to the large number of papers and the interesting recent trends. Though it is hard to speculate, the number of RD studies in economic history will possibly grow in the future, perhaps competing with the corpus of IV papers. There are also some studies now combining different identification strategies, a trend that could become more common in the future. There seems to be too a broader shift in the literature from cross country to within county studies, in part searching for better identification. There also appears to be more emphasis on mechanisms of transmission (following Dell 2010; Nunn and Wantchekon, 2011). These include new (often non-instrumented) variables, or meaningful sample splits. Some of these trends echo the criticism voiced by Deaton (2010) on the validity of instruments and randomization.

Generally speaking, economic history has profited from recent advances and refinements coming from the econometrics realm, which could possibly spur new research. Still, the economic history discipline has not moved yet to a more model based or structural approach, as is increasingly seen in other areas such as international trade, urban, health and education economics, and is also discussed throughout this volume (see Donaldson and Hornbeck 2016; Donaldson 2018; Hornbeck and Rotenberg, 2019; Allen and Donaldson, 2018 for important exceptions). Yet it appears that the advent of Historical Econometrics, just as Cliometrics before, is here to stay. Though this was a methodological chapter aimed to capture the spirit of the times, by no means does it advocate for a particular identification strategy. Ultimately, the right tool depends on the question being asked and the nature—if any—of the endogeneity problem at hand.

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Figures and Tables

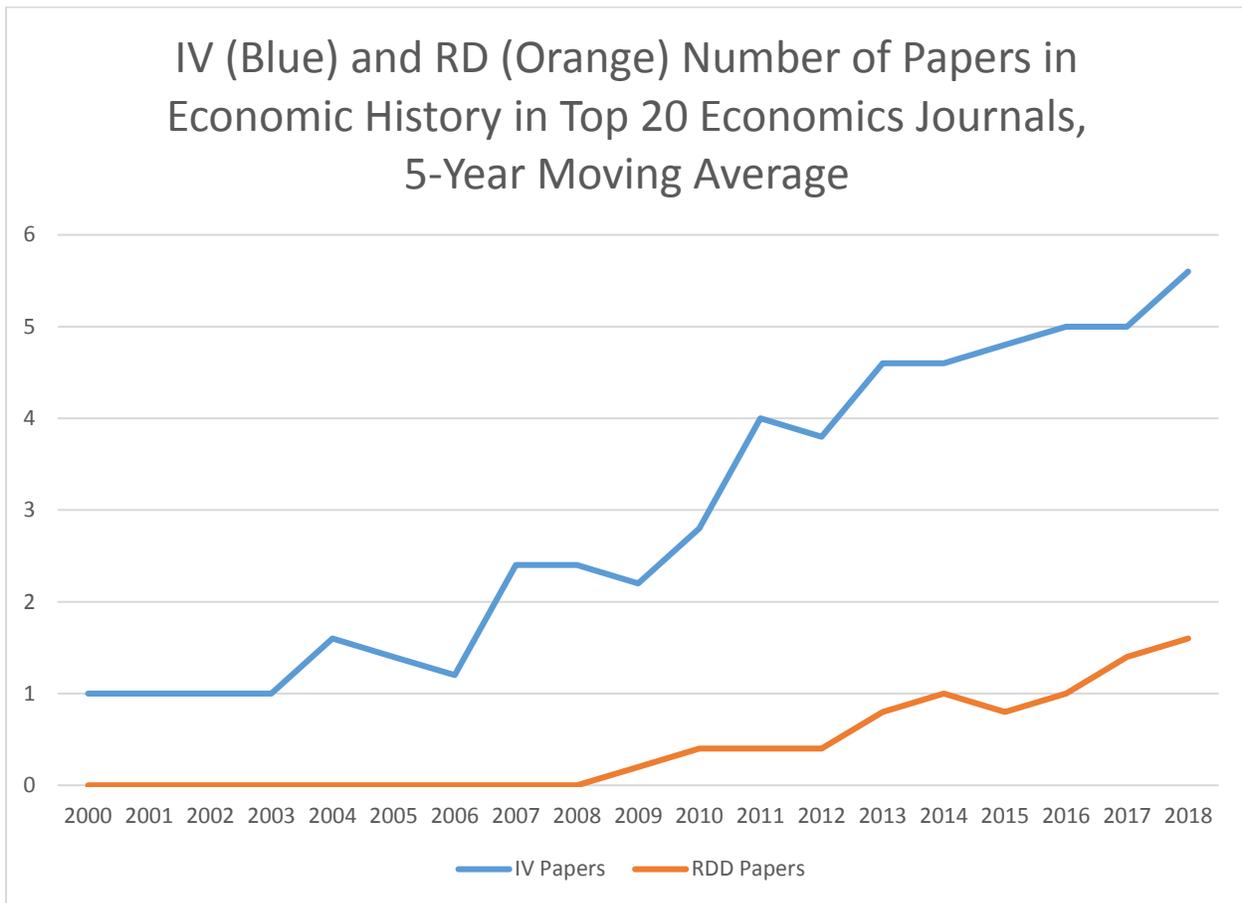


Figure 1. The figure depicts the evolution of the number of IV (blue) and RD (orange) papers in top 20 economic journals, according to Ideas from 2000 to 2018. The trends are smoothed using five year moving averages. Own calculations.

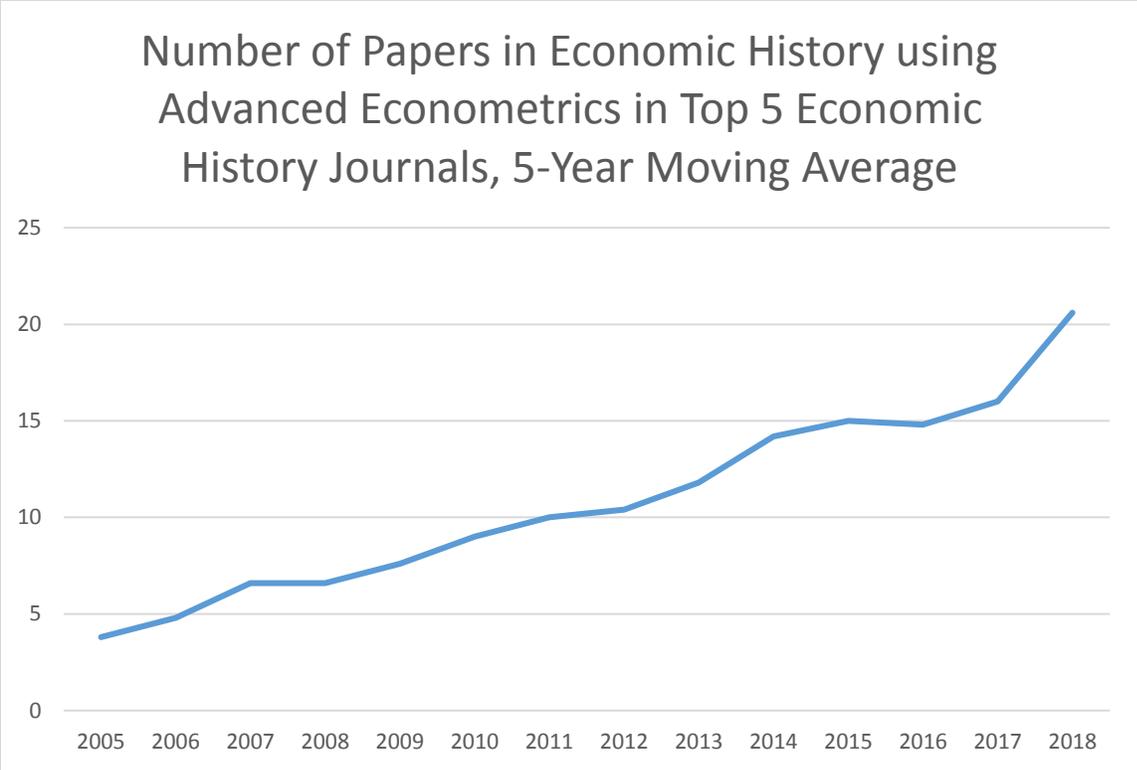


Figure 2A. The figure depicts the evolution of the number of papers using advanced econometrics in top five economic history journals from 2000 to 2018. The trends are smoothed using five year moving averages. Own calculations, based on see Cioni, Federico and Vasta (2020), see their article for details.

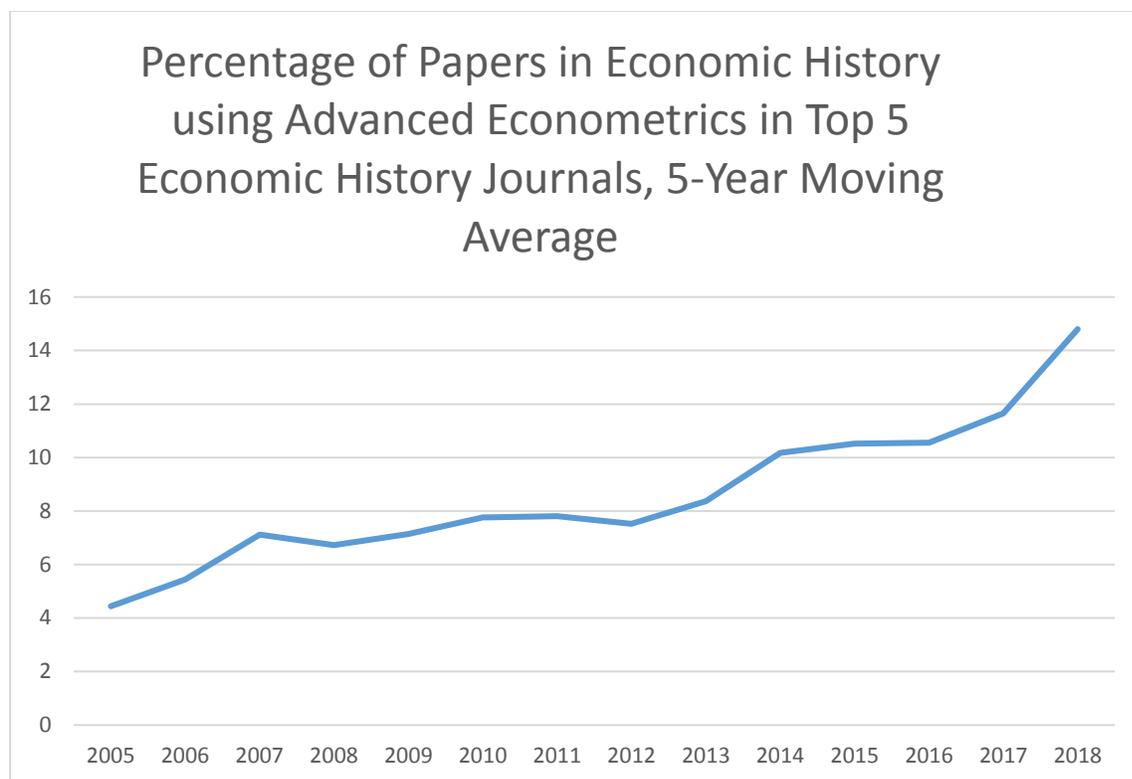


Figure 2B. The figure depicts the evolution of the percentage of papers using advanced econometrics in top five economic history journals, over the total number of papers in these journals. The trends are smoothed using five year moving averages. Own calculations, based on see Cioni, Federico and Vasta (2020), see their article for details.

	Title	Author	Journal	Year	Explanation
1	The Colonial Origins of Comparative Development: An Empirical Investigation	Acemoglu, Daron; Johnson, Simon; Robinson, James A.	AER	2001	Modern institutions instrumented with colonial settler mortality
2	Endogenous Matching and the Empirical Determinants of Contract Form	Ackerberg, Daniel A.; Botticini, Maristella	JPE	2002	Crop choice instrumented by tenant's wealth and town dummies
3	How Do Sex Ratios Affect Marriage and Labor Markets? Evidence from America's Second Generation	Angrist, Josh	QJE	2002	Sex ratio in labor market instrumented by number of immigrants
4	Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution	Acemoglu, Daron; Johnson, Simon; Robinson, James A.	QJE	2002	Population in 1500 instrumented by the population in 1000 and modern institutions instrumented with colonial settler mortality
5	Bones, Bombs, and Break Points: The Geography of Economic Activity	Davis, Donald R.; Weinstein, David E.	AER	2002	Population growth rate from 1940-47 instrumented by number of deaths and number of buildings destroyed per capita
6	Consequences of Bank Distress during the Great Depression	Calomiris, Charles W.; Mason, Joseph R.	AER	2003	Loan supply instrumented by bank size, real estate owned relative to loans and bank net worth relative to total assets
7	Radio's Impact on Public Spending	Stromberg, David	QJE	2004	Access to radio instrumented by geological features that affect the quality of radio reception
8	Women, War, and Wages: The Effect of Female Labor Supply on the Wage Structure at Midcentury	Acemoglu, Daron; Autor, David H.; Lyle, David	JPE	2004	Female labor supply instrumented by military mobilization rates in WWII
9	Does Local Financial Development Matter?	Guiso, Luigi; Sapienza, Paola; Zingales, Luigi	QJE	2004	Financial development instrumented by local banking structure in 1936
10*	The Relationship between Education and Adult Mortality in the United States	Lleras-Muney, Adriana	RESTUD	2005	Years of education instrumented by compulsory education laws
11	The Great Leap Forward: Anatomy of a Central Planning Disaster	Li, Wei; Yang, Dennis Tao	JPE	2005	Retained grain per capita instrumented by weather characteristics

12	History, Institutions, and Economic Performance: The Legacy of Colonial Land Tenure Systems in India	Banerjee, Abhijit; Iyer, Lakshmi	AER	2005	Proportion of non-landlord districts instrumented by British conquest between 1820-56
13	Child Labor and the Labor Supply of Other Household Members: Evidence from 1920 America	Manacorda, Marco	AER	2006	Child labor instrumented by child labor laws
14	Did Highways Cause Suburbanization?	Baum-Snow, Nathaniel	QJE	2007	Number of roads built instrumented by number of roads planned in the 1947 national interstate highway
15	The Long-Term Effects of Africa's Slave Trades	Nunn, Nathan	QJE	2008	Number of slaves instrumented by the distance between the country of origin and their destination port
16	Inequality in Landownership, the Emergence of Human-Capital Promoting Institutions, and the Great Divergence	Galor, Oded; Moav, Omer; Vollrath, Dietrich	RESTUD	2009	Land share of large land owners instrumented by state-specific climatic conditions interacted with changes in the price of cotton relative to the price of corn
17	Branch Banking as a Device for Discipline: Competition and Bank Survivorship during the Great Depression	Carlson, Mark; Mitchener, Kris James	JPE	2009	Introduction of a bank branch in a city instrumented by its population in 1922, dummy indicating if the city is in the North and population in the county in 1910
18	Was Weber Wrong? A Human Capital Theory of Protestant Economic History	Becker, Sascha O.; Woessmann, Ludger	QJE	2009	County's share of Protestants instrumented by distance to Wittenberg
19	Asymmetric Information and Adverse Selection in Mauritian Slave Auctions	Dionne, Georges; St-Amour, Pascal; Vencatachellum, Desire	RESTUD	2009	Seller and buyer dummy instrumented by number of Heirs
20	Harvests and Business Cycles in Nineteenth-Century America	Davis, Joseph H.; Hanes, Christopher; Rhode, Paul W.	QJE	2009	Cotton, wheat and corn harvest instrumented by precipitation and temperature
21	Quality Matters: The Expulsion of Professors and the Consequences for PhD Student Outcomes in Nazi Germany	Waldinger, Fabian	JPE	2010	Average faculty quality and student faculty ratio instrumented by the dismissal of faculty
22	Dynamics and Stagnation in the Malthusian Epoch	Ashraf, Quamrul; Galor, Oded	AER	2011	Number of years since the Neolithic Revolution instrumented by number of prehistoric domesticable species of plants and animals

23	Information Technology and Economic Change: The Impact of the Printing Press	Dittmar, Jeremiah E.	QJE	2011	Adoption of the printing press instrumented by distance to Mainz
24	The Slave Trade and the Origins of Mistrust in Africa	Nunn, Nathan; Wantchekon, Leonard	AER	2011	Number of slaves instrumented by the distance between the country of origin and their destination port
25	The Consequences of Radical Reform: The French Revolution	Acemoglu, Daron; Cantoni, Davide; Johnson, Simon; Robinson, James A.	AER	2011	Institutions instrumented by number of years of French presence
26	Compulsory Licensing: Evidence from the Trading with the Enemy Act	Moser, Petra; Voena, Alessandra	AER	2012	Number of licensed patents in the US instrumented by number of patents from the enemies in WWI
27	Forced Coexistence and Economic Development: Evidence from Native American Reservations	Dippel, Christian	ECON	2014	More centralized reservations instrumented by historical mining rushes
28	Peer Effects in Science: Evidence from the Dismissal of Scientists in Nazi Germany	Waldinger, Fabian	RESTUD	2012	Average peer quality and number of peers instrumented by the dismissal of scientists
29	Urban Growth and Transportation	Duranton, Gilles; Turner, Matthew A.	RESTUD	2012	Number of highways in 1983 instrumented by number of 1947 planned interstate highway kilometres, 1898 kilometres of railroads and an index of 1528–1850 exploration routes
30	The 'Out of Africa' Hypothesis, Human Genetic Diversity, and Comparative Economic Development	Ashraf, Quamrul; Galor, Oded	AER	2013	Genetic diversity instrumented by migratory distance from East Africa
31	On the Origins of Gender Roles: Women and the Plough	Alesina, Alberto; Giuliano, Paola; Nunn, Nathan	QJE	2013	Historical plough use instrumented by geo-climatic conditions
32	How the West 'Invented' Fertility Restriction	Voigtlander, Nico; Voth, Hans-Joachim	AER	2013	Percentage of land use for pasture in 1290 instrumented by number of days during which grass can grow
33	Immigration and the Diffusion of Technology: The Huguenot Diaspora in Prussia	Hornung, Erik	AER	2014	Share of Huguenots in a city instrumented by population loss in the Thirty year war
34	Local Economic Development, Agglomeration Economies, and the Big Push: 100 Years of Evidence from the Tennessee Valley Authority	Kline, Patrick; Moretti, Enrico	QJE	2014	Manufacturing wages instrumented by Changes in the spline components of manufacturing density lagged by two decades

35	Valuing the Vote: The Redistribution of Voting Rights and State Funds following the Voting Rights Act of 1965	Cascio, Elizabeth U.; Washington, Ebonya	QJE	2014	Presidential turnout growth instrumented by interaction between having a literacy test and percent of black people in the population
36	German Jewish Emigres and US Invention	Moser, Petra; Voena, Alessandra; Waldinger, Fabian	AER	2014	Number of emigree patents between 1920-1970 instrumented by pre-1933 patents of dismissed scientists
37	The Impact of the Great Migration on Mortality of African Americans: Evidence from the Deep South	Black, Dan A.; Sanders, Seth G.; Taylor, Evan J.; Taylor, Lowell J.	AER	2015	Migration to urban areas instrumented by distance from the birthplace to railroad lines
38	Democratization under the Threat of Revolution: Evidence from the Great Reform Act of 1832	Aidt, Toke S.; Franck, Raphael	ECON	2015	Number of riots in a constituency instrumented by travel time distance to Sevenoaks (initial place of riots)
39	Financial Asset Holdings and Political Attitudes: Evidence from Revolutionary England	Jha, Saumitra	QJE	2015	Overseas joint investor instrumented by having 21 years in an IPO year
40	Radio and the Rise of the Nazis in Prewar Germany	Adena, Maja; Enikolopov, Ruben; Petrova, Maria; Santarosa, Veronica; Zhuravskaya, Ekaterina	QJE	2015	Change in radio subscription instrumented by change in the signal strength
41	Elite Recruitment and Political Stability: The Impact of the Abolition of China's Civil Service Exam	Bai, Ying; Jia, Ruixue	ECMTA	2016	Quota for public service instrumented by number of rivers in the region and the change in the exam before the quotas being installed
42	Railroads and American Economic Growth: A 'Market Access' Approach	Donaldson, Dave; Hornbeck, Richard	QJE	2016	Changes in the market access instrumented by water market access
43	Investment Banks as Corporate Monitors in the Early Twentieth Century United States	Frydman, Carola; Hilt, Eric	AER	2017	Intensity of bank firm relationship in 1920 instrumented by intensity of bank firm relationship in 1913
44	The Wind of Change: Maritime Technology, Trade, and Economic Development	Pascali, Luigi	AER	2017	Exports instrumented by geographic isolation of a country, calculating using shipping distances and wind patterns
45	The Economic Effects of the Abolition of Serfdom: Evidence from the Russian Empire	Markevich, Andrei; Zhuravskaya, Ekaterina	AER	2018	Share of serfs instrumented by share of monasterial serfs and land reform implementation instrumented by gentry's level of debt
46	Temporary Protection and Technology Adoption: Evidence from the Napoleonic Blockade	Juhasz, Reka	AER	2018	Location of cotton industry Napoleonic blockade trade cost shock

47	Migrants, Ancestors, and Foreign Investments	Burchardi, Konrad B., Thomas Chaney, and Tarek A. Hassan	RESTUD	2018	Present day ancestry composition instrumented by historical migratory waves
48	Religion, Division of Labor, and Conflict: Anti-semitism in Germany over 600 Years	Becker, Sascha O.; Pascali, Luigi	AER	2019	Jewish lending activity instrumented by city's specialization in trade industries and share of Protestants instrumented by distance to Wittenberg
49	Exit, Voice, and Political Change: Evidence from Swedish Mass Migration to the United States	Karadja, Mounir; Prawitz, Erik	JPE	2019	Immigration from Sweden to the US instrumented by interaction term between frost shocks and distance to emigration ports

Table 1. Papers in top five economics journals in economic history, using Instrumental Variables as the main identification method from 2000 to 2020. * Paper 10 is an IV/RD paper.

	Title	Author	Journal	Year	Explanation
1	The Persistent Effects of Peru's Mining Mita	Dell, Melissa	ECMTA	2010	Spatial discontinuity comparing places with and without mita
2	Pre-colonial Ethnic Institutions and Contemporary African Development	Michalopoulos, Stelios; Papaioannou, Elias	ECMTA	2013	Spatial discontinuity comparing places inside and outside ethnic boundaries
3	National Institutions and Subnational Development in Africa	Michalopoulos, Stelios; Papaioannou, Elias	QJE	2014	Spatial discontinuities from national borders of African countries
4	Democracy, Redistribution, and Political Participation: Evidence from Sweden 1919-1938	Hinnerich, Bjorn Tyrefors; Pettersson-Lidbom, Per	ECMTA	2014	Population threshold for political representation
5	The Long-Run Effects of the Scramble for Africa	Michalopoulos, Stelios; Papaioannou, Elias	AER	2016	Spatial discontinuities from national borders of African countries
6	The Evolution of Culture and Institutions: Evidence from the Kuba Kingdom	Lowes, Sara; Nunn, Nathan; Robinson, James A.; Weigel, Jonathan L.	ECMTA	2017	Spatial discontinuity comparing places inside and outside Kuba Kingdom
7*	Nation Building through Foreign Intervention: Evidence from Discontinuities in Military Strategies	Dell, Melissa; Querubin, Pablo	QJE	2018	Uses discontinuities in military strategies
8	The Historical State, Local Collective Action, and Economic Development in Vietnam	Dell, Melissa; Lane, Nathan; Querubin, Pablo	ECMTA	2018	Spatial discontinuity comparing places inside and outside Dai Viet areas

Table 2. Papers in top five economics journals in economic history, using Regression Discontinuity Designs as the main identification method from 2000 to 2019. * Paper 7 is an RD/IV paper.

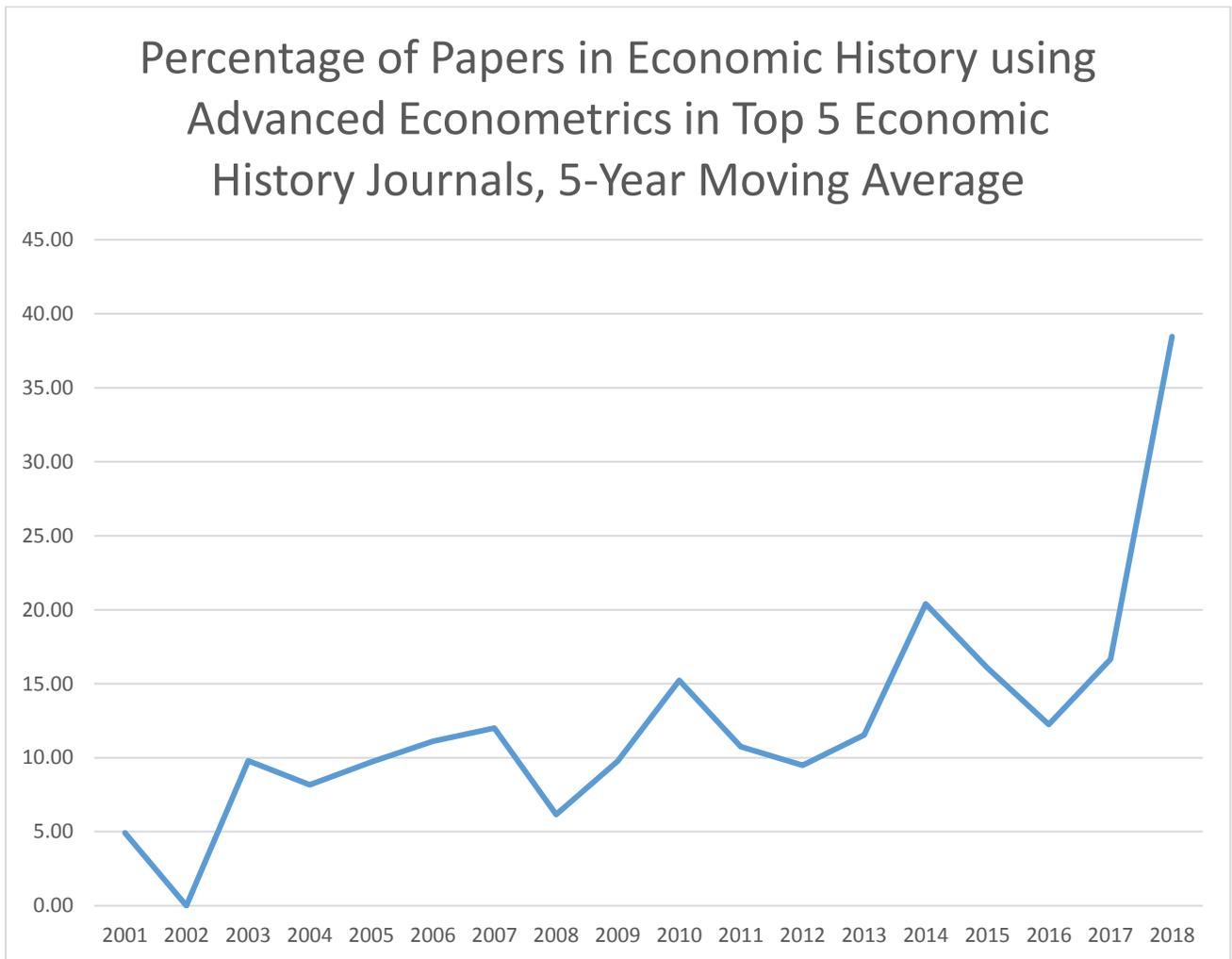


Figure A.1. The figure depicts the evolution of the percentage of papers using advanced econometrics in top five economic history journals, over the total number of papers in these journals using econometrics. The trends are smoothed using five year moving averages. Own calculations, based on see Cioni, Federico and Vasta (2020), see their article for details.

	Title	Author	Journal	Year	Explanation
1	Charity and the Bequest Motive: Evidence from Seventeenth-Century Wills	McGranahan, Leslie Moscow	JPE	2000	Number of family members instrumented by number of members in the testator's parish of residence
2	Race, Roosevelt, and Wartime Production: Fair Employment in World War II Labor Markets	Collins, William J.	AER	2001	Number of cases docketed in each city instrumented by presence of FEPC office, number of ES-270 filled and war-type industry earnings
3	Exchange-Rate Regimes and International Trade: Evidence from the Classical Gold Standard Era	Lopez-Cordova, J. Ernesto; Meissner, Christopher M.	AER	2003	Gold standard dummy instrumented by the product of each country's ratio of gold reserves to bank notes in circulation and Monetary union instrumented by common language
4	The Rise and Fall of World Trade, 1870-1939	Esteveadoral, Antoni; Frantz, Brian; Taylor, Alan M.	QJE	2003	Gold standard dummy instrumented by product of the logarithm of each partner country's average distance from all countries on gold standard
5	Desegregation and Black Dropout Rates	Guryan, Jonathan	AER	2004	Decade of desegregation in high schools instrumented by decade where the district received filed the first legal opinion on that matter and the decade of the first integration plan
6	Surviving Andersonville: The Benefits of Social Networks in POW Camps	Costa, Dora L.; Kahn, Matthew E.	AER	2007	Number of friends (members of the same company) instrumented by if a prisoner was transferred and number of net transfers into a camp
7	Betting on Hitler--The Value of Political Connections in Nazi Germany	Ferguson, Thomas; Voth, Hans-Joachim	QJE	2008	Firm's affiliation with the Nazi Party instrumented by percentage of votes for the Communist party in the firm's region
8	Luther and Suleyman	Iyigun, Murat	QJE	2008	Number of conflicts between Ottoman empire and European powers instrumented by sultan's characteristics
9	Portage and Path Dependence	Bleakley, Hoyt; Lin, Jeffrey	QJE	2012	Log population density instrumented by portage variables (proximity to a river dummy and interaction of portage site with the log of land area in the watershed upstream of the fall line)
10	Coercive Contract Enforcement: Law and the Labor Market in Nineteenth Century Industrial Britain	Naidu, Suresh; Yuchtman, Noam	AER	2013	Employment share in textiles instrumented by distance to Lancashire and pig iron production instrumented by Iron ore production
11	Revolt on the Nile: Economic Shocks, Religion, and Political Power	Chaney, Eric	ECON	2013	Judge changes instrumented by Nile river shocks
12	The Enduring Impact of the American Dust Bowl: Short- and Long-Run Adjustments to Environmental Catastrophe	Hornbeck, Richard	AER	2012	Erosion in counties instrumented by droughts
13	The Anatomy of a Credit Crisis: The Boom and Bust in Farm Land Prices in the United States in the 1920s	Rajan, Raghuram; Ramcharan, Rodney	AER	2015	Number of banks in 1920 instrumented by number of banks in 1910
14	In the Name of the Son (and the Daughter): Intergenerational Mobility in the United States, 1850-1940	Olivetti, Claudia; Paserman, M. Daniele	AER	2015	Father's earnings instrumented by first name of sons dummies
15	The Effect of the TseTse Fly on African Development	Alsan, Marcela	AER	2015	Uses the TSI (TseTse suitability index) as an instrument, reduced form.
16	State Capacity and Military Conflict	Gennaioli, Nicola; Voth, Hans-Joachim	RES	2015	Fiscal revenue of a country instrumented by their war frequency and war frequency instrumented by war frequency in neighbouring states
17	The Institutional Causes of China's Great Famine, 1959-1961	Meng, Xin; Qian, Nancy; Yared, Pierre	RES	2015	Retained grain per capita instrumented by production gap
18	Adapting to Climate Change: The Remarkable Decline in the US Temperature-Mortality Relationship over the Twentieth Century	Barreca, Alan; Clay, Karen; Deschenes, Olivier; Greenstone, Michael; Shapiro, Joseph S.	JPE	2016	Electricity prices instrumented by US census division indicator
19	Bowling for Fascism: Social Capital and the Rise of the Nazi Party	Satyanath, Shanker; Voigtlander, Nico; Voth, Hans-Joachim	JPE	2017	Number of associations in 1920 instrumented by number of associations in 1860
20	Real Effects of Information Frictions: When the States and the Kingdom Became United	Steinwender, Claudia	AER	2018	Difference between export and changes in stock prices instrumented by exports

Table A.1. Economic history papers where the IVs are in the robustness section from 2000 to 2020.

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