Economic Dynamics in the Malthusian Era: Evidence from the 1609 Spanish Expulsion of the Moriscos*

Short title: Economic Dynamics in the Malthusian Era

Eric Chaney and Richard Hornbeck

May 2015

Abstract

We investigate economic dynamics in the Malthusian era using the 1609 expulsion of Moriscos from Spain. Sharp population declines in former-Morisco districts were accompanied by decreased output and increased per capita output. While these short-run results are consistent with standard Malthusian predictions, Malthusian convergence was delayed through 1786 in former-Morisco districts. Archival sources and historical accounts suggest extractive institutions and cultural differences may have contributed to delayed convergence in population and output per capita. This historic episode provides an unusually rich setting to examine Malthusian dynamics, highlighting the potential for sustained differences in per capita output in the Malthusian era.

For the millennia prior to the demographic transition, models of economic growth focus on capturing "Malthusian dynamics." In this Malthusian era, technological growth or population declines are predicted to cause temporary increases in output per capita that dissipate as population grows and the land-to-labor ratio declines.

Scholars have generally found empirical support for the traditional Malthusian predictions. In a recent contribution, Ashraf and Galor (2011) show that both land productivity and technology were historically related to population density rather than income per capita. Impacts of the European Black Death are also consistent with this framework (e.g., Phelps-Brown and Hopkins, 1981; Hatcher, 1996; Clark, 2005), although population and wages appear to converge slowly following this large population shock.

*Eric Chaney, echaney@fas.harvard.edu, Littauer Center, Harvard University, Cambridge, MA, 02138. Richard Hornbeck, hornbeck@fas.harvard.edu, Littauer Center, Harvard University, Cambridge, MA, 02138.
For comments and suggestions, we thank Morten Ravn and anonymous referees, Daron Acemoglu, Quamrul Ashraf, Eli Berman, Venkataraman Bhaskar, Raj Chetty, Greg Clark, Melissa Dell, Oded Galor, Paola Giuliano, Ed Glaeser, Phil Hoffman, Pete Klenow, Marti Mestieri, Nathan Nunn, Caroline Thomas, Jordi Vidal-Robert, Andrea Vindigni, Joachim Voth, David Weil, conference participants at Brown and UCLA, and seminar participants at IAS Princeton, IMT Lucca, and Sciences Po. For sharing data and for numerous helpful discussions, we thank Manuel Ardit. For facilitating data work, we thank the archival staff at the Archive of the Catedral de València. For financial research support, we thank the Weatherhead Center.

The Malthusian era can be more nuanced, however. Many historical civilizations sustained incomes significantly above subsistence, at least for an elite subset of the population. In addition, recent research has argued that large population shocks could lead to sustained increases in incomes by changing the demographic regime (Voigtlander and Voth, 2009, 2013*b*,*a*). Although such nuance can be reconciled with an augmented Malthusian framework, empirical identification of deviations from the canonical model can be challenging. Such identification issues have often limited empirical analysis in the Malthusian era more generally. For example, efforts to identify the effects of population shocks have generally been hampered by the tendency for disease-driven population shocks to affect entire regions and often reoccur, making it difficult to quantify how the area would have changed in the absence of a one-time population shock.[1]

In this paper, we use the expulsion of Spain's converted Muslims (Moriscos) to estimate dynamic responses to a population shock in the Malthusian era. In 1609, the Spanish Crown suddenly and unexpectedly expelled Spain's roughly 300,000 Moriscos. Our empirical analysis focuses on the Kingdom of Valencia, which lost 130,000 Moriscos or roughly one-third of its pre-expulsion population. This loss of population is roughly similar in magnitude to the Black Death in Europe. Importantly, however, there was substantial local variation in the severity of the population shock that allows us to use an identification strategy similar to that used in estimating labor market dynamics in the modern economy (e.g., Card, 1990; Hunt, 1992; Carrington and de Lima, 1996; Friedberg, 2001). To our knowledge, the Moriscos' expulsion provides advantages for empirical estimation that are unprecedented in a Malthusian setting.

We begin by estimating relative changes in population, output, and output per capita for districts with a greater initial population share of Moriscos, controlling for differential changes associated with districts' geographic characteristics (distance to the City of Valencia, distance to the coast, terrain ruggedness, latitude and longitude, average rainfall, and agricultural suitability). By comparing changes in former-Morisco areas to changes in nearby areas, the identification assumption is that these areas would have changed similarly if not for the Moriscos' expulsion.

Our regression estimates provide additional empirical support for the short-run predictions of the Malthusian model: the Moriscos' expulsion led to a sharp relative decline in population and an increase in output per capita in former-Morisco areas. The long-run response in former-Morisco areas, however, may deviate from textbook Malthusian predictions in the sense that output per capita and population remain differentially higher and lower,

[1] For example, in the canonical case of the Black Death, the initial population shock was followed by many subsequent plague outbreaks (Voigtlander and Voth, 2013*b*).

respectively, for 177 years through the end of our sample.

We then investigate whether our results simply reflect slow general convergence rates in the Malthusian era. Indeed, following the Black Death, population levels in England had not fully recovered over a similar time frame (Clark, 2005, 2010). To investigate this possibility, we exploit our district-level panel data to estimate convergence rates for population, output, and per capita output (a la Barro and Sala-i-Martin, 1992). These regressions provide direct evidence that population and per capita output converged abnormally slowly in former-Morisco areas following the expulsion, relative to former-Christian areas in our sample.

Finally, we consider why the expulsion of the Moriscos may have had such long-lasting impacts on population levels and output per capita. The existing literature suggests two main possibilities, though we briefly explore others. A first interpretation emphasizes the role of institutions. Prior to the expulsion, Morisco populations were subject to a harsh institutional framework. This institutional framework is generally thought to have persisted in former-Morisco areas, and may have become harsher in some respects (e.g., Casey, 1971, p. 32). These institutions may have restricted population growth and maintained higher pre-tax per capita output, both by discouraging further Christian in-migration and by preventing in-migrants from retaining surplus income.

A second interpretation emphasizes the role of cultural differences between Christians and Moriscos (e.g., Ardit, 2009*a*). Prior to the Moriscos' expulsion, Christian contemporaries claimed that Moriscos survived on less, married younger, and had more children than their Christian counterparts. This interpretation attributes the results to a cultural shift toward smaller families and increased incomes following the expulsion.

We do not formally distinguish these interpretations, and both may have been in play simultaneously, although we do provide new quantitative evidence on the persistence of extractive institutions. We gather data on the institutional framework in 1786 and document that former-Morisco areas were more likely to be controlled by the nobility (and, in Valencia, noble control was associated with a harsher institutional framework). Similarly, data on a revolt against the nobility in 1693 shows that all rebel leaders were from former-Morisco areas. Historical depictions of the poverty of Christian in-migrants, and nobles' efforts to restrict their mobility, suggest that high tax rates had a role in discouraging population growth and maintaining higher pre-tax output per capita in former-Morisco districts.

Of independent interest is the persistence of extractive institutions in former-Morisco areas, despite the scarcity of labor in the aftermath of the Morisco's expulsion. Acemoglu and Wolitzky (2011) develop a theoretical framework to understand how coercive labor institutions respond to labor scarcity. A key feature is how much initial institutions allow workers to leverage their improved outside options during periods of labor scarcity (North and Thomas, 1971), compared to how much labor scarcity raises landowners' returns from labor coercion (Domar, 1970). We discuss how the Valencian nobility, their creditors, and the Spanish Crown worked together at the expense of peasants to restrict subsequent labor mobility and support the extractive institutional framework. In this sense, institutional responses in Valencia had more in common with the increases in coercion in Eastern Europe following the Black Death (Brenner, 1976) rather than the declines in serfdom in Western Europe following the Black Death (Habakkuk, 1958; Le Roy Ladurie, 1977). This historical case of sudden labor scarcity created an historical "critical juncture" that pushed institutions in one of two directions, depending on the initial institutions and the distribution of political power (Acemoglu and Robinson, 2012). This episode helps to understand how conditions in the Malthusian era can influence the historical development of institutions, which can impact institutions and economic outcomes even today (e.g., Engerman and Sokoloff, 1997; Acemoglu, Johnson and Robinson, 2001, 2002; Banerjee and Iyer, 2005; Dell, 2010).

The main empirical results are consistent with accounts of the Moriscos' expulsion having a large and long-lasting impact on Valencia, though they are less consistent with a classical view emphasizing the importance of a permanent loss of agricultural human capital following the Moriscos' expulsion (e.g., Janer, 1857, pp. 47-48). In particular, our estimated recovery in output suggests that Christian in-migrants were able to return to pre-expulsion levels of output relatively quickly and with fewer workers. This recovery in output might reflect Christian migrants' adaptation to local geography and their accumulation of location-specific human capital, and/or agricultural adaptation to labor scarcity similar to that in the modern growth era (Hornbeck and Naidu, 2014).

Our analysis of delayed Malthusian dynamics relates to theories of the transition from the Malthusian era to the modern growth era (see, e.g., Galor and Weil, 1996, 1999, 2000; Jones, 2001; Galor and Moav, 2002; Hansen and Prescott, 2002; Clark, 2007; Galor, 2011). Many of these theories explore how endogenous shifts in cultural practices, particularly related to fertility behavior, could cause a transition from the Malthusian era. Others have explored how output per capita could increase, even within the Malthusian era, if surpluses encourage elites to wage war and spread disease (see, e.g., Voigtlander and Voth, 2013*b*). Our study complements these literatures, as our results demonstrate that higher output per capita can be sustained through the Malthusian era.

1 Historical Background

1.1 Muslims in the Kingdom of Valencia

Islamic forces invaded the Iberian Peninsula in 711 CE and, over the following 700 years, Muslim and Christian forces fought for control in a series of wars known collectively as the *Reconquista*. Many areas prospered economically under Muslim rule, however, and the Muslim City of Valencia was one of the largest cities in Western Europe. In 1238, the Muslim City of Valencia surrendered to the army of King Jaume I of Aragón, and remained afterward under Christian control.

Immediately following the conquest of Islamic Valencia, Christians in-migrants were a small minority in much of the Kingdom and were separated by linguistic and cultural barriers from the Muslim majority (Ciscar, 1994, p. 134). During the 50 years after the Christian conquest, Islamic society lost many political and cultural elites through failed rebellions and emigration. There appears to have been limited cultural convergence within Valencia, however, and there remained differences in social structures between the Islamic and Christian communities within the Kingdom. For example, Valencia's Muslim communities were characterized by tribal social structures based on clans and marriage between first cousins (Meyerson, 1991, p. 254).

Institutional changes occurred more quickly in the decades following the conquest, as Islamic governmental structures were replaced by "feudal" institutional arrangements (Meyerson, 1991, p. 226). Following the conquest, much of the Kingdom was ceded by the King to the nobility as payment for military or financial aid.[2] The King also ceded much legal jurisdiction over those living on the land, allowing nobles to shape the institutional framework in their domains.

Nobles exploited their Muslim vassals, forcing them to provide labor services and a large share of their harvests. Muslims in Valencia had little alternative but to pay these high costs, though labor scarcity following medieval plagues may have improved Muslims' outside options and lightened extractive pressure (Meyerson, 1991, pp. 112-113, 179-180).

The nobility was forced to grant relatively favorable conditions to attract Christian migrants to the region, who paid little more than the church tithe and seignorial dues (Febrer Romaguera, 2000, p. 40). These favorable conditions were difficult to modify, once codified, and persisted with the political protection of Christians by the Church and the King. By the 16^{th} century, the Christian population had increased from a religious minority to become roughly two-thirds of the Kingdom of Valencia.

Nobles continued to exert considerable influence on local institutions, even after the Spanish monarchy unified the country in the late 15^{th} and early 16^{th} centuries. Local elites maintained autonomy over municipal-level institutions and influenced the overall management of the Kingdom of Valencia. Although a high-ranking noble from outside Valencia

[2]By the end of the Middle Ages, the Crown had alienated roughly three-quarters of the kingdom to the nobility and other elites, such as the church and merchant classes (Febrer Romaguera, 2000, p. 16). The nobility controlled the majority of these alienated lands.

was generally appointed viceroy to act on behalf of the King in overseeing the Kingdom of Valencia, he was aided in his task by a tribunal that was staffed by lawyers from Valencia's merchant class (Canet, 1986). In addition, the King had councils of advisers in Madrid, who were drawn from the tribunal of Valencia and other regions (Casey, 2008, p. 189).

1.2 Moriscos in the Kingdom of Valencia

Nobles' exploitation of Muslims persisted through the forced conversion of Valencia's Muslim population to Christianity in 1525. The former-Muslim population became known as Moriscos, who initially hoped that their involuntary conversion would free them of the forced labor services and higher tax rates. These hopes were not realized, however, and contemporaries noted the challenge for Moriscos to "live like Christians and pay like Muslims" (Ciscar, 1977, p. 122). The Valencian tribunal later recalled that Valencia's Muslims "were as slaves" prior to their baptism and that "at the time of their baptism it was agreed that the Moriscos would have to pay the same that they paid when they were Muslims" (ACA, CA, leg. 221, 8/9).[3]

Like their Muslim predecessors, the Morisco population continued to be exploited by the Valencian nobility. Nobles received a share of the Moriscos' harvest that could reach as high as 40%. Moriscos were also required to present annual gifts and free labor services to the nobility, in addition to purchasing items at above-market prices from stores owned by nobles and grinding their grain in nobles' mills (Ciscar, 1977, pp. 228-235). One contemporary noted that "to say that the Moriscos are slaves of their lords is not appropriate because they are much more than slaves," while another exclaimed that the Moriscos "drink a jug of water and eat a handful of raisins and everything else is for their lords" (Torres, 1969, p. 135). This extractive relationship was reflected in the popular saying: "*quien tiene moro, tiene oro*" or "he who has a Muslim has gold" (Braudel, 1995, p. 789).

In comparison, the Moriscos' Christian neighbors generally did not perform labor services and their payments continued to be limited to a tithe and seignorial dues (Ciscar, 1993, p. 200). The Moriscos may have been subject to even harsher conditions than their Muslim ancestors, as population growth in the 16^{th} century throughout the Mediterranean appears to have decreased Moriscos' outside options and contributed to more-extractive institutions (Meyerson, 1991, pp. 112-113, 180).

Valencia's nobility strove to maintain local Morisco populations and supported the continuation of Islamic social structures and practices, despite pressures by the Spanish Inquisition

[3]Throughout this paper, all archival sources from the Archive of the Crown of Aragón (ACA) are drawn from the *unidad* entitled *Consejo de Aragón* (CA). The number following leg. provides the *legajo*. Following this, the first number after the comma provides the number and that after the slash provides the document within that number.

to eradicate these differences. The nobility are thought to have undermined these attempts at cultural assimilation because Moriscos' continued covert Islamicism served to justify their economic exploitation (Ciscar, 1977, p. 68). Beginning in the 1570s, Valencia's nobility successfully resisted growing pressure to expel the Morisco population (Benítez, 2001).

The Spanish Crown renewed efforts to expel Moriscos in the early 17^{th} century. The King's council noted, however, that "the greatest difficulty that we might face in this endeavor is the resistance of the lords of morisco vassals due to the losses they will sustain" (Benítez, 2001, pp. 398-399).[4]

Despite the nobles' resistance, the decision to expel the Moriscos was made in secret on April 4^{th}, 1609. The King's council initially decided to give the nobles all of the possessions of the Moriscos in their domains (Benítez, 2008, p. 258), as compensation for the nobles' losses and to reduce their opposition to the expulsion. In the months prior to the public announcement of the expulsion, however, the council decided to allow Moriscos to take whatever goods that they could carry to discourage revolt (Benítez, 2008, p. 259). Whatever the Moriscos could not carry would belong to the nobility.

1.3 The Expulsion of Moriscos in 1609

In September 1609, the Spanish Navy gathered off the coast of Valencia and rumors circulated that this concentration of naval power would be used to expel the Moriscos. Valencia's nobles convened and sent an embassy on September 16^{th} to King Phillip III to lobby for the cancellation of the expulsion, citing the "irreparable damages, destruction, affliction and calamities that the Kingdom would inevitably endure following the execution of such a measure" (Salvador, 1998, pp. 129-130). When the nobles' embassy arrived in Madrid, they were informed that the decision was final and that the expulsion had already begun (Halperin, 2008, p. 174). To limit the nobility's resistance to the expulsion, the Viceroy of Valencia was instructed to assure each noble that the King would "work to repair the damages and discomfort that the expulsion will cause by all possible means" (Benítez, 2008, p. 259).

The Moriscos' expulsion was announced publicly on September 22^{nd}. The expulsion order stated that Moriscos could only take what they could carry and that hiding other assets from the nobility was punishable by death (Bleda, 1610, pp. 597-601). Nobles restricted Moriscos' ability to sell their possessions and there was often little time before Moriscos were forced from their homes (Halperin, 2008, pp. 183-184). Some nobles tolerated the sale of goods to incoming Christian settlers, apparently to forestall revolt, though the surge in supply led to what one contemporary called "the cheapest fairs the Kingdom had ever seen" (Benítez,

[4] One potential reason for the Spanish Crown to renew expulsion efforts at this time was to provide a nominal victory after a series of military and political setbacks (Benítez, 2001, p. 430; Furió, 1995, p. 312).

2008, p. 259; Halperin, 2008, p. 179).

Over the following three months, approximately 110,000 Moriscos left Valencia.[5] Many Moriscos were escorted from their homes to exit ports by military force, where the vast majority were taken to North Africa. There were two revolts in October of 1609, though these were limited to mountainous terrain and were quickly subdued (LaPeyre, 1959, pp. 56-57). Some Moriscos continued to hide in the mountains, and the last 15 are reported to have been captured on February 2^{nd}, 1612 (LaPeyre, 1959, p. 67). Overall, the Kingdom of Valencia lost approximately 130,000 Moriscos or roughly one-third of its total population prior to the expulsion.

The loss of agricultural laborers devastated agricultural production in former-Morisco areas and immediately bankrupted many nobles who relied on high tax revenues to pay their debts.[6] Nobles' creditors began legal proceedings to confiscate former-Morisco lands that had been used as collateral (Benítez, 2008, p. 264). The Spanish Crown faced substantial challenges in allocating the financial losses caused by the Moriscos' expulsion, as both the nobility and their creditors wielded considerable influence.[7] In the years following the Moriscos' expulsion, the Crown worked out a balance between these competing interests: nobles' creditors were forced to take substantial losses on their debt, the nobility agreed to pay a share of their debts, and the nobility agreed to assume the Moriscos' debts in exchange for the ability to impose extractive taxes in former-Morisco areas (Benítez, 2008, p. 296; Reglá, 1964, p. 164).

1.4 Christian Settlement of Former-Morisco Areas

Immediately following the expulsion, it seemed that labor scarcity would force the Valencian nobility to relax the extractive conditions in former-Morisco areas. Christian migrants began to occupy former-Morisco areas immediately following the expulsion, at times arriving before

[5]The expulsion of Moriscos also affected areas outside the Kingdom of Valencia, though to a much lesser degree (LaPeyre, 1959).

[6]The Valencian nobility had accumulated large debts prior to the expulsion (Casey, 1975, 2008), and may also have used the expulsion as an excuse to default on those debts (Ciscar, 1977, p. 143).

[7]In November 1609, the King had ordered the nobles to encourage repopulation and guaranteed that migrants' harvest would not be confiscated by creditors (a copy of the edict is reproduced in Boronat, 1901 [1992], pp. 564-567). In February 1610, the tribunal of Valencia (which generally defended creditors at this time) wrote to the King with a list of policy recommendations to deal with the effects of the expulsion. They noted that continuation of the extractive institutional framework would delay the repopulation since "the Christians will not want to pay the services, taxes, labor services, and the share of their crops that the Moriscos paid," but nevertheless suggested that nobles be allowed to establish the institutional conditions they saw fit "even if this included labor services" (ACA, CA, leg. 221, 8/9). In May 1610, the viceroy of Valencia wrote to the King informing him of the grave financial crisis caused by the expulsion because the Kingdom "lives off interest which is not being and cannot be paid" (ACA, CA, leg. 221, 8/6). Since this interest was not paid, Valencia's creditor classes were forced to withdraw substantial funds from Valencia's central bank, which collapsed in 1613 (Reglá, 1964, p. 176; Torres, 1969, pp. 134-136). The bank was recapitalized following its collapse, although it continued to experience difficulties through the 17^{th} century.

the Moriscos had left. This initial wave of migration reflected beliefs that Christians would be able to settle former-Morisco areas under the same tax conditions as in former-Christian areas.

It soon became clear that nobles intended to maintain the extractive institutions in former-Morisco areas, however, and many of the Christian migrants left (Halperin, 2008, pp. 205-207).[8] There was initially high turnover in the resettlements as settlers moved to other resettlements where they believed the conditions were more favorable or moved back to their previous homes (Ciscar, 1975, pp. 148-149). The nobility found it difficult to attract and maintain Christian populations under the continued institutional framework (Casey, 2008, p. 124). A high-ranking cleric noted, in a November 1609 letter to the King, that the nobles "do not want to repopulate their lands despite the fact that there are many potential migrants because they wish to extract from the Christians the same amount that they took from the Moriscos" (cited in Boronat, 1901 [1992], p. 236).

Valencia's nobility made some initial concessions to Christian migrants to encourage them to populate former-Morisco areas. Temporary tax concessions attracted migrants (e.g., Lloret, 2002, p. 355), whereby nobles allowed peasants to pay a smaller share of their crop than stipulated in the resettlement conditions. The remaining payments were often retained as a debt to their new lord, which would be paid in the future (Ciscar, 1975).

Temporary tax concessions served to limit labor mobility, however, as peasants could not legally leave seignorial lands prior to settling existing debts with their lords. Indeed, the nobles had previously used similar techniques to limit the mobility of Valencia's Muslim or Morisco populations prior to their expulsion (Meyerson, 1991, pp. 19-23, 326). The Spanish Crown aided the nobility in maintaining extractive institutions in former-Morisco areas (Casey, 2008, p. 115), issuing edicts that limited labor mobility out of former-Morisco areas in the years after the expulsion (Benítez, 2008, pp. 297, 308).[9]

Nobles maintained control of institutions in former-Morisco areas, imposing higher taxes in former-Morisco areas than were required in former-Christian areas. In former-Morisco areas, the peasants had to pay a larger share of the harvest to their lord, the local market was heavily controlled and dominated by seignorial monopolies, and the election of local officials was largely controlled by the lord (e.g., Ciscar, 1993, pp. 222-225). In a later section of the paper, when discussing interpretations of the empirical results, we review additional

[8]Most immigrants were drawn from surrounding non-Morisco areas, though there are some reports of immigration from outside of Valencia (Torres, 1969). Migrants are thought to have been drawn from Valencia's poorer inhabitants, i.e., those willing to accept an exploitative institutional framework in exchange for land and capital (Ciscar, 1993, p. 189; Torres, 1969, p. 73).

[9]The Spanish Crown continued to protect Christians by prohibiting forced labor services in former-Morisco areas (Casey, 2008, p. 106), but subjected Christian settlers to the high taxes and broad institutional framework established by nobles in former-Morisco areas.

qualitative and quantitative evidence on the persistence of extractive institutions and their abolishment in the early 19th century.

2 Data Construction

2.1 Agricultural Output and Population Data

Historical data are available to proxy for the total value of agricultural output by district in Valencia. The Archbishopric of Valencia was entitled to a fixed proportion of approximately 10% of all agricultural output in each administrative tithing district (or *delmari*) under its jurisdiction.[10] Rather than directly collect agricultural goods, the Archbishopric separately auctioned the right to collect its share of output in each district over the subsequent four years in exchange for upfront fixed cash payments.[11] The Archbishopric of Valencia recorded the value of each winning bid in each tithing district and time period.

Some important assumptions are necessary, however, for percent changes in district-level tithe auction prices to be roughly equal to percent changes in the value of agricultural output. First, we assume that there was no collusion amongst risk-neutral bidders who had accurate expectations over the value of agricultural output.[12] Second, we assume that there were minimal changes in the cost of tithe collection. In practice, we need these assumptions to hold conditional on the control variables included in the empirical specifications.

The Moriscos' expulsion may have affected tithe auction prices through channels other than decreased agricultural labor availability, though we expect many of these effects to be concentrated in the immediate aftermath of the expulsion. Tithe valuations in former-Morisco districts may have reflected higher risk in periods following the expulsion, which would understate both output and output per capita. Nobles' defaults on loans and the temporary collapse of the Valencian central bank may have caused deviations from friction-free asset pricing, though our first post-expulsion tithe data is drawn after the worst of the post-expulsion financial crisis had passed. While the Spanish Crown was looking for ways to compensate nobles after the expulsion, the tithes were managed independently by the Church.

These tithe auction prices appear to be a reasonable proxy for the value of agricultural output by district, particularly given the typical limitations on output data in the pre-

[10] The rate at which agricultural output was taxed by the Church appears to have remained constant over the entire sample period (Ardit, 1987). Prior to our sample period, the Church had transferred a share of its collection rights (usually a third of the tithe) in most areas to the King who in turn eventually transferred these rights to the nobility. The Church's share remained fixed over our sample period, however, and the collection rights were priced and recorded separately by the Church.

[11] Each November, the Archbishopric announced which tithing districts were to be auctioned. On January 6^{th} and 7^{th} of the following year, the collection right for each district was sold to the highest bidder.

[12] Winning bids were usually made by local merchants in that district, as locals were in the best position to forecast the value of collection rights and to collect the taxes (Llibrer, 2011).

industrial era. We are grateful to Manuel Ardit for providing transcriptions of unpublished district tithe data.[13] Our data contribution has been to define the geographic area of each tithing district, which allows us to assign each tithing district its pre-expulsion population of Moriscos, its total population in particular years, and its local geographic characteristics.[14]

We assign each district its towns' population in 1569, 1609, 1622, 1646, 1692, 1712, 1730, 1768, and 1786.[15] For these periods in which population and output data are both available, we calculate the average value of district tithes within a 10-year window.[16]

2.2 Morisco and Christian Districts

The main geographic unit of analysis is a tithing district, of which there are 98 in our main sample.[17] Some district borders changed over the analyzed time period, but the geographic unit of analysis is held constant by summing tithe auction prices over sub-divided parcels (Ardit, 1987).

Figure 1 maps the tithing districts, shaded to reflect the Morisco population share in 1609 prior to the expulsion.[18] The population is 0% Morisco in 31 districts (shaded white),

[13]These records have survived in a series of books known as the *Llibres d'arrendaments dels delmaris de l'arquebisbat de València*, which are now in the Archive of the Catedral de València. The period from 1501 to 1800 is covered in books 4388 to 4401, which have been used by Manuel Ardit in a series of publications (Ardit, 1987, 2009*b*). Casey (2008) also uses these data and provides some aggregate statistics for the entire Archbishopric of Valencia. We use the auction prices for the tithes known as "pa i vi," which included all of the tithed crops in most areas (Ardit, 1987, p. 291).

[14]In doing this work, we are grateful for assistance from archivists at the Archive of the Catedral de València and from Manuel Ardit. We created a digitized map of Valencia's historical tithing districts using manuscripts 4440 and 4441 from the Archive of the Catedral de València, which list the population centers in each tithing district, and a 17^{th} century map provided by Ardit that defines the municipal boundaries of the population centers. We then assigned town-level population data to tithing districts based on name and geographic proximity, using the map provided by Ardit and information provided in Badenes and Bernat (1994). The matching procedure and data coverage are imperfect: some towns are missing in particular Census years or may be assigned to the wrong district. Measurement error in population (or output) would bias the analysis of convergence rates, but the empirical analysis verifies the results' robustness to a GMM approach that would mitigate the bias from measurement error by using instrumental variables.

[15]Town-level population data are available from three sources. First, from a manuscript created between 1565 and 1572, town populations in the Kingdom of Valencia were compiled by Chabás (1890). Second, Badenes and Bernat (1994) provide town-level population data from Censuses conducted throughout the Kingdom of Valencia in 1609, 1646, 1692, 1712, 1730, 1768, and 1786. Third, for 1622, we use the population data provided in the *ad limina* visit organized by the Vatican (Cárcel, 1988). Population data initially record the number of households and then record the number of individuals in 1768 and 1786; following standard practice in this historical literature, households are assumed to contain 4.5 individuals.

[16]We assign the auction value in year t to years $t+1$, $t+2$, and $t+3$. For each population census year, we then average tithe data over all periods from 5 years before to 4 years after. For 1609, we limit the tithe data to years before the Moriscos' expulsion. Tithe data are available in most years, and no tithe data are available for 0.8% of the final district-year observations.

[17]Of the 102 tithing districts in the Archbishopric of Valencia, three districts (Rambla, Ressalany and Russafa) are omitted because we were unable to identify their geographic boundaries. In addition, we omit the district Riu de Millars because it is non-contiguous.

[18]Mapped boundaries do not each reflect distinct tithing districts, as some districts contain non-contiguous

between 0% and 100% Morisco in 36 districts (shaded light gray), and 100% Morisco in 31 districts (shaded medium gray). In the second category, Morisco population shares are fairly evenly distributed between 0% and 100% with a mean of 50%. The City of Valencia is in the Northeast, in a cross-hashed non-tithing area, and the coastline is to the East.

Crucially, the 1609 population data includes the number of Christians and Moriscos prior to the expulsion. Morisco communities had been largely segregated from Christian communities, so it was not difficult to identify and expel the Morisco population. For the few instances of mixed-religion households, the Crown allowed Morisco children under six and their mothers to remain. Morisco fathers were expelled, regardless of the age of the children, along with any older children (Dadson, 2009, p. 216).

2.3 Pre-expulsion Differences Between Morisco and Christian Districts

The main empirical analysis compares changes over time in Morisco and Christian districts, but we begin by exploring cross-sectional differences between these districts prior to the Moriscos' expulsion. Table 1 reports estimates from regressing district-level outcomes in 1609 on districts' Morisco population share in 1609. Column 2 reports that population, output, and output per capita were substantially lower in Morisco districts in 1609.

Part of these observed differences can be attributed to observed geographic differences between Morisco and Christian districts. Column 3 reports smaller estimated differences when controlling for seven observed geographic characteristics of districts: distance to the City of Valencia, distance to the coast, average terrain slope, latitude, longitude, average rainfall, and agricultural suitability.[19]

Population was lower in Morisco districts, which could partly reflect the greater tax burden on Moriscos, though the difference is statistically insignificant after controlling for geographic characteristics. Lower measured output and output per capita in Morisco districts may partly be a statistical artifact, reflecting the historical management of Church tithes. In the years before Valencia's Muslims were forced to convert to Christianity in 1525, they did not pay tithes directly to the Church (Meyerson, 1991, p. 167). After their conversion to Christianity, the Moriscos (former Muslims) began to pay tithes. It is possible, however, that the Church's share of these tithes was smaller in the Morisco areas than in Christian areas because a larger share was assigned to the lord at the time of the Moriscos' conversion

pieces.

[19]Geographic distances are measured from a district's centroid and distance to the coast is calculated using the coastline of Valencia in the 17^{th} century. Average slope within a tithing area is calculated from GTOPO30 data on elevation (http://eros.usgs.gov/). Latitude and longitude are measured at a district's centroid. Average rainfall and agricultural suitability are both drawn from the maps provided by the Spanish Ministry of Agriculture (available at http://sig.magrama.es/geoportal). There are two main rainfall values and two main agricultural suitability values in the sample region, so the regressions control for the fraction of each district with lower rainfall or lower agricultural suitability.

(Halperin, 2008, p. 131). If the Church's share of the tithe was systematically lower in the Morisco areas, this would cause systematically lower tithe auction values in Morisco areas.

The main empirical specifications focus on changes over time in former-Morisco and former-Christian districts, including district fixed effects to absorb cross-sectional differences in geography or the Church's tithe share. Further, as the impact of districts' fixed characteristics may change over time, the empirical analysis focuses on specifications that control for these seven geographic characteristics interacted with each year.[20]

3 Post-expulsion Changes in Morisco and Christian Districts

3.1 Changes in Morisco and Christian Districts, 1609 to 1622

For an initial view of the raw data, Figure 2 plots the 1609 to 1622 change in district-level outcomes against the district's Morisco population share in 1609. Panel A shows that population declined dramatically in districts with a large population share of Moriscos in 1609. Population also declined in entirely-Christian districts, reflecting migration to former-Morisco districts. However, migration was insufficient to equalize the percent population decline across districts.

While the Moriscos' expulsion initially impacted most districts to some degree, the empirical analysis focuses on estimating the relative impact on districts with a greater Morisco population share in 1609. Rather than attempt to recover the aggregate impact of the expulsion, this comparison identifies relative impacts from a plausibly exogenous relative decline in population.[21]

Figure 2, panel B, shows that output also declined relatively from 1609 to 1622 in districts with a larger population share of Moriscos in 1609. Panel C shows that output per capita generally increased relatively in districts that had a larger population share of Moriscos, which is consistent with a declining population and fixed production factors.

Figure 3 plots the residual variation in districts' outcome changes against districts' residual Morisco population share in 1609, after controlling for districts' seven observed geographic characteristics. There is now more continuous variation in districts' Morisco population share, which predicts a fairly clear linear impact on relative changes in district outcomes from 1609 to 1622. Conditional on districts' geographic characteristics, districts with a greater Morisco population share have a very large decline in population, a large decline in output, and a moderate increase in output per capita.

[20] We have seen no indication that the Church permanently sold (or acquired) portions of tithe collection rights in our sample period, from 1569 to 1786 (see also Ardit, 1987).

[21] Because non-Morisco districts were also affected through out-migration, we suspect that the aggregate effects of the Moriscos' expulsion are larger than our estimated relative changes in population, output, and output per capita.

Figure 4 plots the mean change from 1609 to 1622 for three groups of districts, and then extends these changes through 1786.[22] The three groups correspond to those in Figure 1: 31 districts with 0% Morisco population in 1609 (dotted line), 36 districts with between 0% and 100% Morisco population in 1609 (dashed line), and 31 districts with 100% Morisco population in 1609 (solid line). Population declines from 1609 to 1622 largely persisted through the 17th century as total population remained similar, and average population in each group increased similarly through the 18th century as total population increased (Panel A). Output declines from 1609 to 1622 also persisted, but converged somewhat more over time as total output increased through the 18th century (Panel B). By contrast, population and output had been increasing from 1569 to 1609, and somewhat more so in districts with a greater Morisco population share. Output per capita increased after the Moriscos' expulsion and remained higher in former-Morisco districts, and was largely unchanged through the 18th century in districts that had no Moriscos in 1609 (Panel C). The following empirical analysis focuses on estimating relative changes by districts' Morisco population share in 1609.

3.2 Estimated Relative Changes After the Expulsion

Preliminary empirical specifications estimate relative changes in districts with a greater Morisco population share in 1609, controlling for districts' geographic characteristics. Outcome Y in district d and year t is regressed on the district's Morisco population share in 1609, year fixed effects, district fixed effects, and districts' geographic characteristics:

$$ln(Y_{d,t}) = \beta_t Morisco_d + \alpha_t + \alpha_d + \gamma_t \mathbf{X}_d + \epsilon_{d,t}. \tag{1}$$

Note that β is allowed to vary by year, so each estimated β is interpreted as the average difference between 100% Morisco districts and 0% Morisco districts in that year relative to the omitted base year of 1609. Note also that γ is allowed to vary by year, so the impact of districts' geographic characteristics is allowed to change in each time period.

The main identification assumption is that districts with a greater Morisco population share in 1609 would have changed similarly to other districts, if not for the Moriscos' expulsion. In practice, this assumption must only hold after controlling for differential changes associated with districts' geographic characteristics. For example, an empirical concern is that changes in agricultural prices might vary by district, perhaps due to changes in transportation costs to Valencia or other markets. To the extent that changes in agricultural prices are correlated with Morisco population share, the hope is that these changes are absorbed by controlling for distance to Valencia and distance to the coast (each interacted with year). Similarly, while changes in agricultural technology may have differential impacts

[22] Outcome values are normalized to zero in 1609.

by district, the specifications control for districts' terrain ruggedness, longitude, latitude, average rainfall, and agricultural suitability (each interacted with year). For the statistical inference in all specifications, standard errors are clustered at the district level to adjust for heteroskedasticity and within-district correlation over time.

From estimating equation (1), Figure 5 (panel A) reports estimated changes in log population in a formerly 100% Morisco district relative to changes in a formerly 0% Morisco district. The solid circles indicate the point estimates in each year, relative to the omitted base year of 1609, and the vertical lines indicate 95% confidence intervals.

From 1609 to 1622, former-Morisco districts experienced an 85 log point or 57% relative decline in population. Post-expulsion declines in population are statistically significant in each time period. Population in former-Morisco districts had partially recovered by 1786, though Morisco districts' population had been increasing relatively from 1569 to 1609.

Figure 5, panel B, reports estimated relative changes in the log value of agricultural tithes, as a proxy for the log value of agricultural output. From 1609 to 1622, output declined relatively by 61 log points in former-Morisco districts. The relative decline in output is similar through 1646, but then output recovers in former-Morisco districts even though population remained lower. Output had been increasing relatively from 1569 to 1609 in Morisco districts, though at a somewhat lower rate than population.

Figure 5, panel C, reports estimated relative changes in the log value of tithes per capita. From 1609 to 1622, this proxy for output per capita increased relatively by 25 log points in former-Morisco districts. Output per capita remained higher and increased further over the next 164 years. By contrast, there had been statistically insignificant declines in output per capita in former-Morisco districts from 1569 to 1609.

Research on the Malthusian era sometimes focuses on estimating the elasticity of wages with respect to population. There are substantial empirical challenges in estimating this relationship, in the absence of a natural experiment, and estimates are generally "too large" in the range of -1 to -2.7 (Lee and Anderson, 2002; Weir, 1991).[23] The estimated increase in output per capita from 1609 to 1622, as a fraction of the estimated decline in population, implies an elasticity of -0.29 (and a standard error of 0.066). This elasticity is consistent with a Cobb-Douglas production function with a land share of 0.29. Similarly, the estimated decline in output from 1609 to 1622, as a fraction of the estimated decline in population, implies a Cobb-Douglas production function with a land share of 0.28 (and a standard error

[23]This elasticity should correspond to the strength of decreasing returns in the production function (Lee and Anderson, 2002; Weir, 1991). For a Cobb-Douglas production function in which land is the only fixed factor, the elasticity should equal the negative of the land share (which cannot be greater than 1). These estimates might be reconciled using a CES production function, but the required elasticity of substitution between land and labor is generally below plausible values.

of 0.072).[24] This land share is within the 0 to 0.40 range considered by Hayami and Ruttan (1985) and would not reject the 0.19 value calculated by Caselli and Coleman II (2001).

Table 2 reports the estimated coefficients from Figure 5, along with the estimated standard errors. Table 2 also reports estimates when excluding the geographic controls. The geographic controls capture some of the cross-sectional differences between Morisco and Christian areas prior to the expulsion, and yet the results are not particularly sensitive to the inclusion of these geographic controls.

Overall, following the Moriscos' expulsion in 1609, these preliminary estimates indicate that former-Morisco districts experienced relative declines in population and output and a relative increase in output per capita. Population remained persistently lower, output recovered more quickly, and there were sustained increases in output per capita.

There are some important limitations to this preliminary analysis, however. Malthusian theory implies an explicit dynamic relationship in economic outcomes, where districts' growth rate depends on their initial outcome value. Because Morisco and Christian districts had different economic outcomes prior to the expulsion, these districts might be expected to experience differential growth after the expulsion. The later empirical analysis explicitly models growth rates as a function of initial outcome values.

Based on this preliminary analysis, it is also difficult to quantify whether convergence in former-Morisco districts was slower than might be expected. After the Black Death, population responses were also slow and "far removed from the immediacy of the response suggested by Malthus himself" (Hatcher, 1996, p. 76). It is difficult to quantify convergence rates following the Black Death, in the absence of a clear counterfactual, but it is natural to consider whether these preliminary results simply reflect slow rates of convergence in the Malthusian era. The following empirical analysis estimates the rate of convergence in the sample, and then reports estimated impacts on former-Morisco areas after adjusting for the expected rate of convergence. Thus, the following analysis formalizes whether population growth in former-Morisco districts was slower than would be expected given their lower levels of population following the expulsion.

3.3 Estimated Convergence after the Expulsion

To better quantify economic dynamics in the aftermath of the Moriscos' expulsion, we now explicitly model districts as converging to steady-state outcome values (a la Barro and Sala-i-Martin, 1992). For each district d, the annual growth rate in outcome Y from period $t-\tau$ to period t will then depend on the difference between that district's steady-state outcome

[24] While the estimated changes between 1609 and 1622 may reflect temporary disruption of production after the expulsion, these estimated ratios are similar to those using estimated changes between 1609 and 1646.

value and that district's outcome value in period $t-\tau$. The district's steady-state outcome value is unobserved, but is allowed to vary by district with the inclusion of district fixed effects (α_d). Districts' steady-state is also allowed to change over time with the inclusion of year fixed effects (α_t). Further, the changes in steady-state are allowed to vary with districts' geographic characteristics by including year-interacted controls for the previously-used seven geographic characteristics ($\gamma_t \mathbf{X}_d$). Conditional on the above controls, we can then directly estimate whether former-Morisco areas experienced differential growth by including a district's Morisco population share in 1609:

$$\frac{ln(Y_{d,t}) - ln(Y_{d,t-\tau})}{\tau} = \delta ln(Y_{d,t-\tau}) + \alpha_d + \alpha_t + \gamma_t \mathbf{X}_d + \beta_t Morisco_d + \epsilon_{d,t} \tag{2}$$

Note that β is allowed to vary by year, so each estimated β is interpreted as the average change after the expulsion in former-Morisco areas' annual rate of growth between period t and the prior period. We sometimes pool the estimated β's, or constrain them to be equal across periods, to report the average impact of the expulsion.[25]

There are some known challenges in estimating equations of this form (e.g., Caselli, Esquivel and Lefort, 1996; Barro, 2012). First, growth regressions often include endogenous variables as controls, though we restrict our attention to time-varying controls for districts' fixed geographic characteristics. Second, estimates of δ are mechanically biased by the inclusion of district fixed effects (Hurwicz, 1991), though this bias becomes small in datasets over a long time horizon (Nickell, 1981; Barro, 2012). This bias is likely to be small in our setting, for which it is relevant that the data span 217 years rather than include 9 time periods. We report some estimates from specifications that omit district fixed effects, though the resulting omitted variables bias will generally attenuate the estimated convergence rate and bias the estimates.[26]

For dynamic panel settings such as this, Arellano and Bond (1991) develop a potential solution to this second econometric concern. After differencing equation (2) over time to eliminate the district fixed effect, the lagged dependent variable term $[ln(Y_{d,t-\tau}) - ln(Y_{d,t-2\tau})]$ is mechanically correlated with the error term $[\epsilon_{d,t} - \epsilon_{d,t-\tau}]$ because $\epsilon_{d,t-\tau}$ is a component of $ln(Y_{d,t-\tau})$. However, in the absence of serial correlation in $\epsilon_{d,t}$ (or second-order serial correlation in $\epsilon_{d,t} - \epsilon_{d,t-\tau}$), $ln(Y_{d,t-2\tau})$ is a valid instrument for $[ln(Y_{d,t-\tau}) - ln(Y_{d,t-2\tau})]$

[25]In theory, the estimated δ is predicted to vary non-linearly with the time between periods (τ). In practice, estimating equation (2) using non-linear least squares introduces undesirable properties from including fixed effects and many controls. This is only an issue when the time between periods varies over the sample period; as the predicted δ would only vary slightly with the differences in sample periods, we do not allow δ to vary with τ.

[26]Districts with higher outcome values may have higher unobserved steady-states, so those districts may not grow much slower than districts with lower outcome values.

(Anderson and Hsiao, 1982). A more efficient GMM estimator makes additional use of all further lagged values as instruments, which also permits tests for overidentifying restrictions and for serial correlation in $\epsilon_{d,t}$ (Arellano and Bond, 1991).

This GMM estimator would also mitigate bias arising from classical measurement error in the lagged dependent variable. Measurement error could also be non-classical, such as if there were persistent differences across districts between the measured tithe auction prices and unmeasured output. Fixed percentage differences in measurement would be absorbed by district fixed effects, and the hope is that any varying differences in measurement (that are correlated with Morisco population shares in 1609) would be absorbed by the inclusion of year-interacted geographic controls.

Given that our empirical focus is on dynamic responses to the Moriscos' expulsion, rather than estimating convergence rates, we can also assume a value of δ and verify the robustness of β_t. Previous research has also struggled to estimate convergence rates (δ), however, so a secondary contribution of our paper is to provide new estimates of Malthusian convergence rates using our data and preferred econometric specifications.[27]

Table 3, column 1, reports estimated impacts on population from our preferred econometric specification. The estimated impact of lagged population (δ), which is reported in the first row, implies that population convergence is generally fast in the sample region and has a half-life of 21 years (ln(2)/0.033). Districts with 1% lower population, all else equal, are predicted to experience a 0.033 percentage point faster annual growth rate of population. This control variable captures the sense in which former-Morisco districts would be expected to experience faster population growth because their population had declined below their district steady-state, such that the subsequent rows report whether former-Morisco areas grew differently than expected. Districts' expected growth rates are also allowed to vary over time, using the former-Christian areas as a comparison group, and in a manner that varies with districts' geographic characteristics.

Population growth was substantially lower in former-Morisco areas from 1609 to 1622 (Table 3, column 1, row 2), which reflects the immediate decline in population following the Moriscos' expulsion. The annual population growth rate remained 2.5 to 1 percentage points lower than expected in former-Morisco districts from 1622 through 1786 (Table 3, column 1, rows 3 – 8). That is, while former-Morisco areas would be expected to grow faster after a large decline in population, the rate of population growth was slower than expected in all periods through 1786.

[27] Our estimated rates of convergence would not only reflect the typical Malthusian channels of fertility and mortality to the extent that labor was mobile across districts, though our sense from the historical literature is that cross-district labor mobility was fairly restricted in periods other than the immediate aftermath of the Moriscos' expulsion.

Pooling the six estimated coefficients from 1646 through 1786, the bottom of column 1 reports that the annual growth rate was roughly 1.7 percentage points lower on average.[28] This estimate implies that steady-state population would be 40% lower in former-Morisco areas, which roughly coincides with estimates from Table 2.[29] An F-test rejects the equality of the individual coefficients from this period, however, as the coefficients are estimated to increase by roughly 1 percentage point over 100 years.[30] Still, population growth rates remain below expectation in former-Morisco districts in each observed period.

Column 2 reports estimates when omitting district fixed effects. The estimated convergence rate is substantially lower, consistent with the anticipated omitted variables bias, and the estimated half-life increases to 154 years (row 1). Population growth remains below expectation after the expulsion, though the coefficients are no longer statistically significant in each period (rows 3 – 8). The annual population growth rate is lower by a statistically significant 0.8 percentage points from 1622 through 1786, on average, and an F-test does not reject the equality of the year-specific coefficients.

Columns 3 and 4 report the results when estimating equation (2) using GMM (Arellano and Bond, 1991). Column 3 reports similar estimates as column 1, though there are indications of second-order serial correlation that would violate the exclusion restriction for some of the instrumental variables. As an adjustment, Column 4 reports estimates when restricting the instruments to be third-order (or greater) lagged values of population. There is no indication of third-order serial correlation, but the lagged impact of population is imprecisely estimated and has the "wrong sign." Despite there being no estimated expectation of convergence, population growth still remains lower than expected in former-Morisco districts through 1786. The individual estimates are mostly not statistically significant, but the pooled estimate is more precise and statistically significant and we do not reject the equality of the estimated coefficients.

Column 5 reports estimates when constraining the impact of lagged population to be -0.01 (row 1), which reflects a convergence half-life of roughly 70 years. This parameter value reflects a typical estimate of population convergence rates in the Malthusian era (Lee, 1973, 1987, 1993; Lee and Anderson, 2002), with other values ranging between -0.0065 and -0.0136. When constraining the half-life of convergence to be roughly 70 years, the former-Morisco areas have depressed population growth rates between 1622 and 1786. The estimated

[28] The pooled effect is found by estimating equation (2), replacing the year-specific Morisco variables with an interaction between districts' Morisco share and an indicator variable for the 1646 – 1786 period.

[29] Setting the growth rates equal to zero in both former-Morisco and former-Christian areas, the log ratio of these districts' steady-state population is equal to $-\beta$ / δ.

[30] The 100 year trend is found by estimating equation (2), replacing the year-specific Morisco variables with an average effect (as in the previous footnote) and a trend effect (in units of 100 years).

magnitudes are between those in columns 1 and 2, and closer to the estimates in column 2.

Table 4, column 1, reports estimated impacts on output from our preferred specification, where district output is proxied by the recorded value of Church tithe auctions. In general, output is estimated to converge with a half-life of roughly 32 years. The annual growth rate of output is substantially lower in Morisco areas from 1609 to 1622, which reflects the initial impact of the Moriscos' expulsion. Output continues to grow at a lower rate than expected for some time, though former-Morisco areas are mostly converging along the expected growth path through the 18^{th} century. There is a positive trend in these coefficients, for periods from 1646 to 1786, that is of the same magnitude as the positive trend in the population coefficients from column 1 of Table 3.

Columns 2 through 4 report estimates from alternative empirical specifications, which generally continue to show slowed initial output growth and convergence in later periods. Column 2 reports estimates when omitting district fixed effects, which increases the estimated half-life of convergence to 578 years and is likely to reflect omitted variables that influence districts' steady-state output.[31] Column 3 reports results when estimating equation (2) using GMM and there is no indication of second-order serial correlation that might invalidate the instrumental variables used. Column 4 reports estimates when constraining the convergence rate for output, as in Table 3.

The estimated declines in output are generally smaller in magnitude than the estimated declines in population, comparing the estimates in column 1 of Tables 3 and 4. Column 5 reports the difference in these coefficients, and their standard error, from estimating both regressions in a seemingly unrelated regression framework. Output recovers faster than population in each period, relative to the expected convergence in output and population.

Table 5 reports results from directly estimating changes in output per capita, which is a more restricted specification than comparing the separately-estimated impacts on output and population. Column 1 reports that output per capita grew substantially in former-Morisco areas immediately following the Moriscos' expulsion. The estimated impact of lagged output per capita implies that areas experiencing higher output per capita should converge to steady-state fairly quickly, yet former-Morisco areas experienced lower convergence (or higher growth) than expected through 1786. Column 2 omits district fixed effects, which reduces the estimated convergence rate and the persistence of higher output per capita growth in former-Morisco areas. Column 3 constrains the convergence rate, which also reduces the estimated magnitudes in later periods.[32] Pooling the estimates from 1646 through 1786, in

[31] With substantial variation in districts' steady-state output, there will generally appear to be slow convergence when low-output districts do not grow faster than high-output districts.

[32] If we assumed a faster convergence rate, such as the 2% rate of convergence often estimated in the modern era, the persistent impacts on output per capita would be larger.

columns 2 or 3, the continued growth in output per capita is marginally statistically greater in former-Morisco areas.

Columns 4 and 5 report similar estimates to column 1, based on GMM estimates of equation (2). Column 4 reports estimates using all further lagged values of output per capita as instruments for the lagged value of output per capita (Arellano and Bond, 1991), though the Hansen J test marginally indicates potential bias from some of the included instruments. Column 5 restricts the included instruments to have the same impact in each sample year, which yields very similar results and less indication of bias.

Overall, these dynamic panel regressions indicate the Moriscos' expulsion had large initial impacts that were often persistent. Population declined greatly in former-Morisco areas and, in contrast to the average fast convergence rate, population growth in former-Morisco areas remained slower than expected through 1786. Output also declined in former-Morisco areas, though output more quickly grew along the expected growth path. Comparing the estimated impacts on population growth and output growth, or directly estimating impacts on growth of output per capita, output per capita increased immediately after the Moriscos' expulsion and continued to increase more than expected (or converge slower than expected) through 1786.

4 Historical Interpretations

The empirical results indicate that the Moriscos' expulsion had long-lasting impacts on former-Morisco areas. The estimated decline in population is persistent in former-Morisco areas, conditional on the estimated convergence rate for population generally in the sample region. In the Malthusian era, a decline in population and a corresponding increase in output per capita are typically associated with convergence in population through migration, increased fertility, and decreased mortality, leading to convergence in output per capita. By contrast, following the Moriscos' expulsion, there were sustained increases in per capita output in former-Morisco areas. Below, we discuss some potential explanations for this estimated persistence.

4.1 Persistence of Extractive Institutions

One contributing factor may have been a persistence of extractive institutions in former-Morisco areas, which may have slowed population convergence by limiting labor income. While output per capita was higher in former-Morisco districts, the imposition of high tax rates on Christians in these areas would discourage further migration and demographic responses through fertility and mortality. Casey (2008, p. 24) notes that birth rates remained low in former-Morisco areas, despite a relatively high land-to-labor ratio after the expulsion. The population in these areas also may have suffered "nutritional deficiencies," perhaps increasing mortality rates. Casey (2008, pp. 24, 44) attributes these phenomena, in part, to "the low level of economic development" due to the "harshness of the new [post-expulsion] seigneurial rent terms."

We do not have direct evidence that extractive institutions delayed population convergence through these Malthusian channels, but we have brought together some historical accounts and new data that suggest there was indeed a persistence of extractive institutions in former-Morisco areas. We discuss this institutional persistence at some length, as it is also of independent interest that extractive institutions persisted in former-Morisco areas despite increased labor scarcity following the Moriscos' expulsion. This historical episode provides an interesting example in which labor scarcity created an historical "critical juncture" (Acemoglu and Robinson, 2012), after which institutions remained extractive due to heightened financial incentives and elites' ability to restrict workers' outside options (Acemoglu and Wolitzky, 2011). We discuss some qualitative and quantitative indications that, for 200 years after the Moriscos' expulsion, Christians faced very different institutional regimes depending on whether their areas were settled earlier by Moriscos.

The Peasant Revolt of 1693. There was a Christian peasant uprising in 1693, which appears to have been in response to the continued harshness of extractive institutions in former-Morisco areas. There were reports in 1689 that some peasants in former-Morisco areas had begun to "conspire to not pay the dues that they had always paid to their lord" (ACA, CA, leg. 579, 53/2), and formal legal proceedings were initiated to evaluate peasants' claims that peasants' historical privileges had rendered illegal the extractive institutions imposed after the expulsion of the Moriscos. The peasants' claims were rejected in February 1693, and the extractive institutions were upheld, on the grounds that King Philip III had allowed the nobility to impose high taxes in former-Morisco areas in exchange for assuming the Moriscos' debts.[33] The peasants appealed the case to the King, though the case was referred back to a tribunal in Valencia that was likely to rule against the peasants (García Martínez, S., 1991, p. 268).

On July 9 of 1693, a peasant revolt began with the arrest of four peasants who refused to

[33] The document providing the legal decision states that the areas of Valencia "newly populated after the expulsion of the Moriscos wished to become free of the many charges and taxes that they pay their lords" (ACA, CA, leg. 579, 53/3). It continues by summarizing the five legal arguments made by the peasants' appointed legal representatives, and provides a detailed refutation of each argument. The peasants' general argument is that when King Philip III ceded the Moriscos' belongings to the nobles, this was done on the condition that the nobles charge taxes comparable to those in former-Christian areas. The council rejected this claim, as King Philip III had also obliged the nobles to assume the Moriscos debts and in exchange "the nobles legitimately established the [harsh] conditions of repopulation with the agreement of the new vassals." Furthermore, the council noted that had Philip III not allowed the nobility to impose higher extraction rates following the expulsion "the King would have not given the nobles anything, rather he would have only loaded them with the community and individual debts of the Moriscos."

supply their noble's share of the crops. The revolt spread to include between four thousand and six thousand peasants, culminating in a battle on the 15th of July in which the peasants were defeated (García Martínez, S., 1991, pp. 270-272). A list of the names and homes of thirty-six leaders of this revolt (ACA, CA, leg. 579, 50/2) provides some quantitative evidence that the extractive institutions were relatively harsh in former-Morisco areas: all of the revolt leaders are recorded as being from former-Morisco areas.[34] Given this stark relationship in the data, an actual regression analysis is unnecessary.

Spanish War of Succession, 1700 – 1714. Peasant discontent continued in former-Morisco areas after the suppression of the revolt. During the Spanish war of succession, peasants from former-Morisco areas supported the Austrian archduke's claim to the Spanish throne. Supporters of the archduke sent one of the 1693 rebellion leaders to gain peasant support in Valencia, promising freedom from oppressive taxes (Kamen, 2001, p. 45). The archduke lost the war, however, and the extractive institutional framework remained in place.

Additional testimony from the 17^{th} and 18^{th} centuries suggest that the former-Morisco areas retained a relatively harsh institutional framework. One historian sums up this evidence by noting that peasants in former-Morisco areas who were "[u]nable to pay the high rents introduced after the expulsion," sometimes became "recruits for the bandit gangs which were so active in the kingdom" (Casey, 2008, p. 101). An observer in the early 18^{th} century noted that the nobles in Valencia "enjoy such exorbitant taxes and dues from many of their vassals that they turn them from free men into slaves, or else into desperadoes, who take to robbing on the highways and stirring up trouble rather than work in the fields" (cited in Casey, 2008, p. 114). Another contemporary in the 18^{th} century noted that inhabitants of former-Morisco areas "are loaded with seignorial tributes and appear to only work to fill the coffers of their lords" (Cavanilles, 1958, p. 202).

Institutional Control in 1786. As a proxy for the geographic distribution of extractive institutions, we have obtained data on whether particular areas were under the control of a secular noble in 1786.[35] The institutional framework in Valencia is thought to have been harsher (on average) in areas controlled by the nobility (Halperin, 2008, p. 59), though we do not have direct data on the persistence of extractive institutions themselves.

The Census of Floridablanca indicates whether particular towns were under the jurisdiction of a secular noble ("señorío secular") (Instituto Nacional de Estadística, 1991). We merge these data to our geographic tithing districts, and assign each district the fraction of

[34] After merging this list with districts' Morisco population share in 1609, all of the merged leaders are from districts with a large population share of Moriscos.

[35] Here we assume that the Census of Floridablanca measured institutions the same year it measured population.

towns under the control of nobles.[36]

Districts with a higher Morisco population share in 1609 are substantially more likely to be under noble control in 1786. The estimated percentage of towns under noble control in 1786 rises from 56% in former-Christian districts to 98% in former-Morisco districts, and this difference is highly statistically significant with a standard error of 8%.[37] This result suggests that the institutional framework continued to be harsher in former-Morisco areas following the expulsion.[38] It is important to note here, however, that historians have generally posited a two-tiered seignorial regime in Valencia. In contrast to the extractive framework suffered in former-Morisco areas, noble areas that had been inhabited by Christians prior to the expulsion are thought to have had a more benign institutional framework that was closer to that prevailing on royal lands (Ciscar, 1993, pp. 185-186).[39] Thus, we expect that the difference in the fraction of lands under noble control is an understatement of the institutional differences between former-Christian and former-Morisco areas.

Abolition of Extractive Institutions, 1808 – 1813. Popular opposition to this institutional framework appears to have intensified in the late 18^{th} century, though Napoleon's invasion of Spain in 1808 marked the beginning of the end of the Spanish Ancien Regime. In 1808, Napoleon declared the abolition of the Spanish seignorial regime (De Moxó, 1965, p. 16). The independent Spanish government made a similar pronouncement in 1811. In 1811, one Valencian representative cited the Moriscos' expulsion as when "all the evils that Valencia suffers today began" (Ardit, 1977, p. 181) and noted in 1813 that those who repopulated the formerly Morisco areas "substituted the expelled in their slavery" and sarcastically asked whether "after receiving illegal and exorbitant tributes for over two centuries have the nobility finally been compensated for the losses that they claimed [following the expulsion]?" (De

[36]The Census of Floridablanca provides the modern-day municipality for each population center, as of 1990. We reconstructed these municipal boundaries using the 2012 boundaries (http://www.arcgis.com/home/item.html?id=2e47bb12686d4b4b9d4c179c75d4eb78) and information on municipal splits from the Spanish Institute of Statistics (http://www.ine.es/intercensal/?L=0). We assigned a town center to a tithing district if the centroid of its modern municipality falls within the boundary of that tithing district. One tithing district (Canet de Berenguer) has no 1786 data within its boundaries, and so that district is dropped from the sample.

[37]These estimates are from regressing the fraction of towns under noble control on the district's Morisco population share in 1609. The estimated constant is 0.561 and the estimated impact of Morisco population share is 0.414 with a robust standard error of 0.078. Controlling for districts' geographic characteristics, the estimated difference is 0.379 with a robust standard error of 0.086.

[38]We have also experimented with including ecclesiastical lordships and areas controlled by military orders in our definition of lands controlled by the nobility, such that the omitted group is land controlled by the Crown. In this case, the estimated constant is 0.82 and the estimated impact of Morisco population share is 0.17 with a robust standard error of 0.049. Controlling for districts' geographic characteristics, the estimated difference is 0.14 with a robust standard error of 0.050.

[39]While a substantial fraction of towns continued to be under the control of secular nobles in former-Christian districts, the nobility was substantially restricted in their ability to extract resources in areas populated by Christians following the reconquest.

Moxó, 1965, pp. 206-207).

Notably, the application of the 1811 declaration was delayed in Valencia until the final evacuation of French troops in 1813. French forces appear to have found the existing seignorial regime useful to fund military actions and to ensure support from Valencia's nobility (Ardit, 1977, pp. 157-158, 202, 204-205).

The final dismantling of Valencia's seignorial regime stretched over the following decades. During this period, the former-Morisco areas of Valencia experienced some of the "greatest conflict" in Spain, including "violent confrontations" between nobles and their vassals (Artola, 1978, pp. 172-173). As the differential treatment of former-Morisco areas was removed, observers decried the impoverished state of inhabitants in former-Morisco areas (Ardit, 1968, p. 37). The extractive institutional framework in former-Morisco areas may have had long-term effects even after its final dissolution, contributing to the delay in Valencian industrialization (García, 1974).

4.2 Cultural and Demographic Differences between Moriscos and Christians

Extractive institutions in former-Morisco areas are only one potential factor, however, which might have contributed to the sustained decreases in population and increases in output per capita in former-Morisco areas. This institutional interpretation stresses that high tax rates discouraged in-migration of Christians and prevented high output per capita from translating into high consumption per capita and impacting mortality and birth rates. If the institutional framework remained roughly constant before and after the expulsion, however, then it is difficult to understand why steady-state population should remain significantly lower in former-Morisco areas in the absence of other factors.[40] One potential explanation is that some authors, most prominently Ciscar (1977, 1993), have argued that the institutional framework eventually imposed even higher monetary costs on Christians than on the Moriscos. The historical evidence is less clear on how the degree of extraction changed in Morisco areas following the expulsion, however, as compared to the general persistence of extractive institutions in some form.

Another potential interpretation stresses the importance of systematic differences in the demographic equilibrium across Morisco and non-Morisco areas prior to the expulsion. Some contemporaries believed there were systematic differences between Moriscos and Christians that, all else equal, would lead to higher population density in Morisco areas. Drawing on the previous historical background, it seems plausible that the Morisco population retained

[40]Note also, that the imposition of more-extractive institutions on Moriscos should have depressed population density and raised per capita output in former-Morisco areas prior to the expulsion. As we note above, though, it is difficult to use cross-sectional variation to test these predictions prior to the expulsion due to confounding geographic factors and potential differences in the Church's share of the tithe across districts.

distinctive practices after its forced conversion to Christianity. Relevant differences could include different preferences for child quality vs. child quantity (Galor and Moav, 2002), differences in fertility or mortality (Galor and Weil, 1996; Voigtlander and Voth, 2009, 2013*b*,*a*), or differences in subsistence consumption levels (Abdus and Rangazas, 2011).

For example, contemporaries claimed that the age of marriage of Morisco girls was much lower than among Christians (e.g., Casey, 1971, p. 30). To the extent that this claim is true, it would generally be associated with higher lifetime fertility in the Morisco population.[41]

In another example, contemporary observers stressed that Morisco populations survived on less than their Christian counterparts.[42] Indeed, in the decades prior to the Moriscos' expulsion, observers claimed that the Morisco populations were growing at a faster rate than Christian populations and routinely attributed this differential growth to the fact that Moriscos consumed less than their Christian counterparts.[43]

Overall, a shift in cultural and demographic characteristics may have resulted in a change in the Malthusian equilibrium following the Moriscos' expulsion, contributing to the persistent decrease in population and increase in per capita output. Some caution is required in interpreting these historical accounts, however, as Casey (1971, p. 30) argues that contemporary testimony regarding demographic and cultural differences between Moriscos and Christians was generally provided by Christian writers whose views were often biased. Further, an interpretation based only on shifting cultural and demographic characteristics is less consistent with poverty-induced impacts on mortality and fertility that have been associated with former-Morisco areas (e.g. Casey, 2008, p. 24). We expect that some combination of many of these factors contributed to the persistent decrease in population and increase in per capita output.

4.3 Technological Adaptation

In contrast to the estimated persistent declines in population, output recovered more quickly in former-Morisco areas. Initial increases in output per capita should, in principle, have been sufficient to encourage population convergence, but it is interesting to consider what factors might have driven the comparatively faster convergence in output.

One potential explanation is that Christian migrants reacquired location-specific human capital that had been lost with the expulsion of the Moriscos, or otherwise adapted to

[41] It is worth noting, however, that more recent analysis of archival data has shown a similar female age at marriage in Christian and Morisco communities (Casey, 2008, p. 18).

[42] One seigniorial agent noted that prior to the expulsion Moriscos could subsist on less than 1/7th the land needed by the Christian resettlers (Casey, 2008, p. 43). Another ecclesiastical official noted in 1582 that Christians needed twice what Moriscos needed to subsist (Ardit, 2009*a*, p. 67).

[43] One characteristic quote comes from a bishop in 1587 who claimed that "in a very few years [the Moriscos] will multiply in such away that they will surpass [the Christians because the Moriscos] collect everything and do not spend since they neither eat, nor drink, nor wear clothes or shoes" (Ardit, 2009*a*, p. 68).

agricultural production in former-Morisco areas. The empirical results are not sensitive to controlling for geographic characteristics, interacted with time, which suggests a limited direct role for geographic differences between former-Morisco and former-Christian areas. Christian migrants might have overcome temporary challenges, however, in adapting to geographically different former-Morisco areas.

Indeed, there are some indications that Moriscos and Christians had differential economic performance in geographically different areas. Prior to the expulsion, population and output are more sensitive to rainfall and agricultural suitability in Morisco districts: in districts with a greater Morisco population share, population and output increase by more in districts with higher rainfall and agricultural suitability. Moriscos may have taken better advantage of better geographic conditions or, equivalently, were more negatively impacted by worse geographic conditions.[44] If Christians learned over time to exploit better geography, and continued to be hurt less by worse geography, that would contribute to higher output over time.

Former-Morisco and former-Christian areas had similar fractions of lands with higher rainfall and higher agricultural suitability, however, so Christian migrants may not have been entirely unfamiliar with former-Morisco lands.[45] Instead, the estimated interaction effects could reflect unobserved land quality in former-Morisco districts varying more with our measured geographic characteristics. Unobserved differences in land quality would be absorbed by district fixed effects in the main analysis, but could confound the estimation of these cross-sectional differences in the pre-expulsion period.

Another potential explanation for the recovery in output is that persistent labor scarcity encouraged labor-saving agricultural adaptation. Labor-saving technological adaptation is not typically associated with the Malthusian era because population itself responds to labor scarcity. If this population response is slow, however, then there remains substantial incentive for labor-saving technological adaptation in the Malthusian era. Adaptation to labor scarcity in the Malthusian era may then not be entirely distinct from adaptation in the modern growth era (Habakkuk, 1962; Allen, 2009; Acemoglu, 2010), with particular parallels between the Spanish Moriscos' expulsion and the decrease in black population following the 1927 Mississippi flood (Hornbeck and Naidu, 2014).

Systematic district-level data are unavailable for a formal analysis of production adjust-

[44] In particular, from a regression interacting the Morisco population share with rainfall or agricultural suitability, there is generally a more positive impact of better geography in districts with more Moriscos. We include only rainfall or agricultural suitability, as the two measures of geographic productivity are highly correlated and the estimates are unstable when both are included.

[45] From a regression of districts' Morisco population share in 1609 on districts' geographic characteristics, rainfall and agricultural suitability do not substantively or statistically predict Morisco population share.

ments in former-Morisco areas relative to former-Christian areas, though some historical accounts are consistent with labor-saving production adjustments. Ardit (2009*b*,*a*) describes former-Morisco areas shifting from the cultivation of cereals to the production of cash crops in the century following the expulsion.[46] These areas also experienced a shift in the distribution and management of agrarian property toward larger farm sizes, which is generally associated with decreased labor intensity.

Labor-saving technological adaptation could simply have taken the form of recovering capital stocks, though the Moriscos' expulsion does not appear to have substantially decreased capital stocks below steady-state levels. While Moriscos were able to take whatever goods they could carry, the rest of the capital stock remained in former-Morisco areas. In areas with substantially lower population after the expulsion, there may even have been too much capital relative to the optimal long-run steady-state. Shortly after the expulsion, capital stocks appear to have been allowed to depreciate in former-Morisco areas. By the 1640's, a seignorial administrator attempted to incentivize the upkeep of physical structures that were in "ruin and a terrible state" (Ciscar, 1975, p. 159).

5 Conclusion

Depictions of the Malthusian era generally focus on the long-run constancy of output per capita, as population growth dissipates increases in output per capita from technological advance or population decline. Empirical analysis of the Malthusian era is generally constrained, however, by data limitations and the absence of natural experiments. Most large population shocks, such as the Black Death, affected broad regions and it is difficult to identify impacts over subsequent decades and centuries.

The Moriscos' expulsion offers a uniquely-detailed empirical view of population and output dynamics in the Malthusian era, combining district-level data with a large population shock that is geographically differentiated. The empirical analysis compares districts with a greater Morisco population share to a plausible historical counterfactual, represented by districts with a smaller initial Morisco population share. Further, the analysis is able to control for other changes that might differ with local geographic characteristics. We first consider relative changes in population, output, and output per capita, and then explicitly estimate convergence rates and impacts of the expulsion on the growth rate of each outcome.

After the Moriscos' expulsion in 1609, districts with a greater Morisco population share experienced a substantial relative decline in population. Population convergence was generally fast in the sample region, but population convergence was delayed through 1786 in former-Morisco districts. Output declined in former-Morisco areas after the expulsion, but

[46] In particular, one former-Morisco area shifted 50% of irrigated land from cereals to mulberry trees, whose leaves were used to feed silk worms.

converged more quickly than population. Output per capita increased immediately after the expulsion, and remained higher through 1786. While increases in output per capita typically resulted in convergence across the sample region, there were sustained higher rates of growth in output per capita in former-Morisco districts.

Our empirical analysis focuses on the relative effects of the Moriscos' expulsion, comparing former-Morisco and former-Christian areas. The aggregate effects of the expulsion would differ if there were spillover effects from the expulsion on former-Christian areas, and we expect that labor outflows from former-Christian areas would decrease those areas' output such that aggregate economic losses were greater than the relative losses in former-Morisco areas. Indeed, one line of the historical literature considers the Moriscos' expulsion to have contributed to the economic decline of Spain in the 17^{th} century (Hamilton, 1938).

The Moriscos' expulsion generated substantial and persistent labor scarcity in former-Morisco districts, and it is also interesting to consider how this affected the evolution of extractive institutions. Labor scarcity might have encouraged the relaxation of extractive institutions, but these extractive institutions were perpetuated due to the coordinated financial incentives of powerful elites. Nobles and their creditors were heavily dependent on revenue streams from Morisco peasants, and the Moriscos' expulsion threatened to collapse the socio-economic system. The King helped to coordinate a settlement that maintained high rates of extraction in former-Morisco areas, rather than risk radical social changes along with the widespread confiscation of nobles' landholdings. Extractive institutions were supported by restrictions on worker mobility and accumulated debt obligations, and only collapsed with Napoleon's invasion of Spain. These institutional responses illustrate how labor scarcity might empower workers, but how labor scarcity encourages elites to coordinate and strengthen efforts to coerce workers. Previous research has demonstrated that historical institutions impact modern economic growth, and this historical episode provides some insights into how historical institutions might persist and evolve.

In a Malthusian era perhaps best known for long-run convergence in population and output per capita, the Moriscos' expulsion had long-lasting impacts on population and output per capita. There are some fundamental limitations in our ability to identify which factors are driving this persistence, though we discuss several potential contributing factors related to local extractive institutions, cultural differences, and technological adaptation. This historic episode does provide an unusually rich empirical setting to examine Malthusian dynamics, however, highlighting that there can be sustained differences in per capita output in the Malthusian era.

Eric Chaney, Harvard University
Richard Hornbeck, Harvard University

References

Abdus, Salam, and Peter Rangazas. 2011. "Adult nutrition and growth." *Review of Economic Dynamics*, 14: 636–649.

Acemoglu, D. 2010. "When Does Labor Scarcity Encourage Innovation?" *Journal of Political Economy*, 118(6): 1037–1078.

Acemoglu, D., and A. Wolitzky. 2011. "The Economics of Labor Coercion." *Econometrica*, 79(2): 555–600.

Acemoglu, D., and J. A. Robinson. 2012. *Why Nations Fail.* Crown.

Acemoglu, D., S. Johnson, and J. A. Robinson. 2001. "The Colonial Origins of Comparative Development: An Empirical Investigation." *American Economic Review*, 91(5): 1369–1401.

Acemoglu, D., S. Johnson, and J. A. Robinson. 2002. "Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution." *Quarterly Journal of Economics*, 117(4): 1231–1294.

Allen, R.C. 2009. *The British Industrial Revolution in Global Perspective.* Cambridge Press.

Anderson, T.W., and Cheng Hsiao. 1982. "Formulation and Estimation of Dynamic Models Using Panel Data." *Journal of Econometrics*, 18(1): 47–82.

Ardit, M. 1968. *Els Valencians de les Corts de Cadis.* Rafael Dalmau.

Ardit, M. 1977. *Revolución liberal y revuelta campesina.* Ariel.

Ardit, M. 1987. "Expulsió dels Moriscos i Creixement Agrari al País Valencià." *Afers*, 5/6: 273–316.

Ardit, M. 2009*a*. "The Expulsion of the Moriscos from the Catalan Countries: Ideology and History." *Catalan Historical Review*, 2: 65–81.

Ardit, M. 2009*b*. "Una Reflexión sobre la Expulsión de los Moriscos Valencianos y la Repoblación." *Revista de Historia Moderna*, 27: 295–316.

Arellano, Manuel, and Stephen Bond. 1991. "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations." *Review of Economic Studies*, 58(2): 277–297.

Artola, M. 1978. *Antiguo Régimen y revolución liberal.* Ariel.

Ashraf, Q., and O. Galor. 2011. "Dynamics and Stagnation in the Malthusian Epoch." *American Economic Review*, 101(5): 2003–2041.

Badenes, M., and J. Bernat. 1994. *Crecimiento de la Población Valenciana: Análisis y Presentación de los Censos Demográficos.* Edicions Alfons el Magnànim.

Banerjee, Abhijit, and Lakshmi Iyer. 2005. "History, Institutions and Economic Performance: The Legacy of Colonial Land Tenure Systems in India." *American Economic Review*, 95(4): 1190–1213.

Barro, Robert J. 2012. "Convergence and Modernization Revisited." *NBER Working Paper 18295.*

Barro, Robert J., and Xavier Sala-i-Martin. 1992. "Convergence." *Journal of Political Economy*, 100(2): 223–251.

Benítez, R. 2001. *Heroicas Decisiones: la Monarquía Católica y los Moriscos Valencianos.* Institució Alfons el Magnànim.

Benítez, R. 2008. "Justicia y Gracia: Lerma y los Consejos de la Monarquía ante el Problema de la Repoblación del Reino de Valencia." In *La Monarquía de Felipe III.* , ed. J. Martínez Millán and M. Antonietta Visceglia, 255–331. Fundación Mapfre.

Bleda, J. 1610. *Defensio fidei in causa neophytorum sive morischorum Regni Valentiae totiusque Hispaniae.* Apud Ioannem Chrystostomum Garriz.

Boronat, P. 1901 [1992]. *Los Moriscos Españoles y su Expulsión, vol. II.* Universidad de Granada.

Braudel, F. 1995. *The Mediterranean and the Mediterranean World in the Age of Philip II, volume II.* University of California Press.

Brenner, R. 1976. "Agrarian Class Structure and Economic Development in Pre-Industrial Europe." *Past & Present*, 70: 30–75.

Canet, T. 1986. *La Audiencia Valenciana en la Época Foral Moderna.* Edicions Alfons el Magnànim.

Cárcel, M. 1988. "La Población de las Diócesis Valencianas a través de las Relaciones "Ad Limina"." Edicions Alfons el Magnànim.

Card, David. 1990. "The Impact of the Mariel Boatlift on the Miami Labor Market." *Industrial and Labor Relations Review*, 43(2): 245–257.

Carrington, William J., and Pedro J.F. de Lima. 1996. "The Impact of the 1970s Repatriates from Africa on the Portuguese Labor Market." *Industrial and Labor Relations Review*, 49(2): 330–347.

Caselli, Francesco, and John Coleman II. 2001. "The U.S. Structural Transformation and Regional Convergence: A Reinterpretation." *Journal of Political Economy*, 109(3): 584–616.

Caselli, Francesco, Gerardo Esquivel, and Fernando Lefort. 1996. "Reopening the Convergence Debate: A New Look at Cross-Country Growth Empirics." *Journal of Economic Growth*, 1(3): 363–389.

Casey, J. 1971. "Moriscos and the Depopulation of Valencia." *Past and Present*, 50: 19–40.

Casey, J. 1975. "La situación económica de la nobleza valenciana en vísperas de la expulsión de los moriscos." In *Homenaje al dr. D. Juan Reglà Campistol.* 515–526. Universtat de València.

Casey, J. 2008. *The Kingdom of Valencia in the Seventeenth Century.* Cambridge University Press.

Cavanilles, A. 1958. *Observaciones sobre la Historia Natural, Geografía, Agricultura, Población y Frutos del Reyno de Valencia; Vol. 2.* Consejo Superior de Investigaciones Científicas.

Chabás, R. 1890. "Descripción del Reino de Valencia, 1565 á 1572." *Archivo*, 4: 373–388.

Ciscar, E. 1975. "El Endeudamiento del Campesinado Valenciano en el Siglo XVII." *Estudis*, 4: 147–162.

Ciscar, E. 1977. *Tierra y Señorío en el País Valenciano.* Del Cenia al Segura.

Ciscar, E. 1993. *Moriscos, Nobles y Repobladores.* Edicions Alfons el Magnànim.

Ciscar, E. 1994. "Algaravía y Algemía. Precisiones sobre la Lengua de los Moriscos en el Reino de Valencia." *Al-Qantara*, 15(1): 131–162.

Clark, G. 2005. "The Condition of the Working Class in England, 1209-2003." *Journal of Political Economy*, 113: 1307–1340.

Clark, G. 2007. *A Farewell to Alms: A Brief Economic History of the World.* Princeton University Press.

Clark, G. 2010. "The Macroeconomic Aggregates for England, 1209-2008." *Research in Economic History*, 27: 51–140.

Dadson, T. 2009. "Los moriscos que no salieron." *Pedralbes*, 29: 213–246.

Dell, M. 2010. "The Persistent Effects of Peru's Mining Mita." *Econometrica*, 78(6): 1863–1903.

De Moxó, S. 1965. *La Disolución del Régimen Señorial en España.* Consejo Superior de Investigactiones Científicas.

Domar, Evsey D. 1970. "The Causes of Slavery or Serfdom: A Hypothesis." *Journal of Economic History*, 30(1): 18–32.

Engerman, Stanley L., and Kenneth L. Sokoloff. 1997. "Factor Endowments, Institutions and Differential Paths of Growth Among New World Economies." In *How Latin America Fell Behind.* , ed. Stephen Haber. Stanford University Press.

Febrer Romaguera, M. 2000. *Dominio y explotación territorial en la Valencia foral.* Universitat de València.

Friedberg, Rachel M. 2001. "The Impact of Mass Migration on the Israeli Labor Market." *Quarterly Journal of Economics*, 116(4): 1373–1408.

Furió, A. 1995. *Història del País Valencià.* Edicions Alfons el Magnànim.

Galor, O. 2011. *Unified Growth Theory.* Princeton University Press.

Galor, O., and D. Weil. 1996. "The Gender Gap, Fertility, and Growth." *American Economic Review*, 86(3): 374–387.

Galor, O., and D. Weil. 1999. "From Malthusian Stagnation to Modern Growth." *American Economic Review*, 89(2): 150–154.

Galor, O., and D. Weil. 2000. "Population, Technology, and Growth: From Malthusian Stagnation to the Demographic Transition and Beyond." *American Economic Review*, 90(4): 806–828.

Galor, O., and O. Moav. 2002. "Natural Selection and the Origin of Economic Growth." *Quarterly Journal of Economics*, 117: 1133–1191.

García, M. 1974. "El marco histórico de la industrialización valenciana." *Información comercial española*, 485: 135–146.

García Martínez, S. 1991. *Valencia Bajo Carlos II.* Ayuntamiento de Villena.

Habakkuk, H.J. 1958. "The Economic History of Modern Britain." *Journal of Economic History*, 18(4): 486–501.

Habakkuk, H.J. 1962. *American and British Technology in the Nineteenth Century: the Search for Labour-saving Inventions.* Cambridge Press.

Halperin, T. 2008. *Un conflicto nacional: moriscos y cristianos viejos en Valencia.* Universitat de València.

Hamilton, E. 1938. "Revisions in Economic History: VIII.-The Decline of Spain." *Economic History Review*, 8(2): 168–179.

Hansen, G., and E. Prescott. 2002. "Malthus to Solow." *American Economic Review*, 92: 1205–1217.

Hatcher, J. 1996. "Plague, population and the English economy, 1348-1530." In *British Population History: From the Black Death to the Present Day.* Cambridge University Press.

Hayami, Y., and V.W. Ruttan. 1985. *Agricultural Development: An International Perspective.* Johns Hopkins Press.

Hornbeck, R., and S. Naidu. 2014. "When the Levee Breaks: Black Migration and Economic Development in the American South." *American Economic Review*, 104(3): 963–996.

Hunt, Jennifer. 1992. "The Impact of the 1962 Repatriates from Algeria on the French Labor Market." *Industrial and Labor Relations Review*, 45(3): 566–572.

Hurwicz, L. 1991. "Least-Squares Bias in Time Series." In *Statistical Inference in Dynamic Economic Models.* , ed. Tjalling C. Koopmans. Wiley.

Instituto Nacional de Estadística. 1991. *Censo de 1787 "Floridablanca" Tomo VI.* Instituto Nacional de Estadística.

Janer, F. 1857. *Condición Social de los Moriscos de España.* Real Academia de la Historia.

Jones, C.I. 2001. "Was an Industrial Revolution Inevitable? Economic Growth Over the Very Long Run." *Advances in Macroeconomics*, 1: 1–45.

Kamen, H. 2001. *Philip V of Spain.* Yale University Press.

LaPeyre, H. 1959. *Géographie de l'Espagne Morisque.* S.E.V.P.E.N.

Lee, Ronald. 1973. "Population in Preindustrialist England: An Econometric Analysis." *Quarterly Journal of Economics*, 87(4): 581–607.

Lee, Ronald, and Michael Anderson. 2002. "Malthus in state space: Macro Economic-Demographic Relations in English History, 1540-1870." *Journal of Population Economics*, 15(2): 195–220.

Lee, Ronald D. 1987. "Population Dynamics of Humans and Other Animals." *Demography*, 24(4): 443–465.

Lee, Ronald D. 1993. "Accidental and Systematic Change in Population History: Homeostasis in a Stochastic Setting." *Explorations in Economic History*, 30: 1–30.

Le Roy Ladurie, Emmanuel. 1977. *The Peasants of Languedoc.* University of Illinois Press.

Llibrer, I. 2011. "La Catedral de Valencia como Administrador General del Diezmo de la Diócesis. Aspectos Históricos, Económicos, Contables y Organizativos." *Paper presented at the XVI congress of the Asociación Española de Contabilidad y Administración de Empresas, 23 September.*

Lloret, P. 2002. "Los Intentos Repobladores del Señor de Olocau tras la Expulsión de los Moriscos. La Carta Puebla de 1610." *Estudis*, 28: 345–365.

Meyerson, M. 1991. *The Muslims of Valencia.* University of California Press.

Nickell, Stephen. 1981. "Biases in Dynamic Models with Fixed Effects." *Econometrica*, 49(6): 1417–1426.

North, Douglass C., and Robert Paul Thomas. 1971. "The Rise and Fall of the Manorial System: A Theoretical Model." *Journal of Economic History*, 31(4): 777–803.

Phelps-Brown, H., and S.V. Hopkins. 1981. *A Perspective of Wages and Prices.* Methuen Publishing.

Reglá, J. 1964. *Estudios sobre los Moriscos.* Universidad de Valencia.

Salvador, E. 1998. "La Cuestión de los Censales y la Expulsión de los Moriscos Valencianos." *Estudis*, 24: 127–146.

Torres, J. 1969. *Repoblación del Reino de Valencia, después de la Expulsión de los Moriscos.* Ayuntamiento de Valencia.

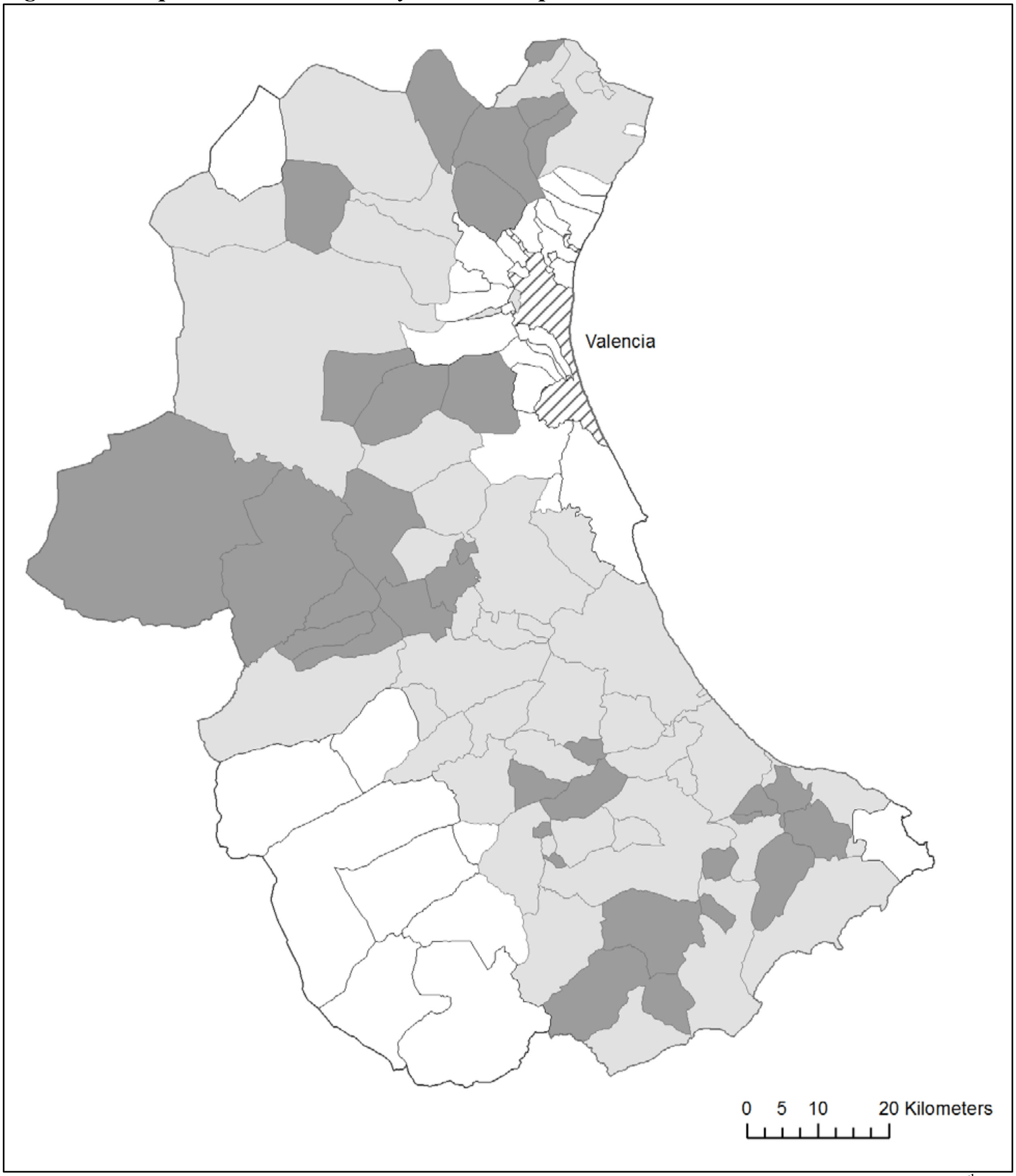
Voigtlander, N., and H.-J. Voth. 2009. "Malthusian Dynamism and the Rise of Europe: Make War, Not Love." *American Economic Review: Papers and Proceedings*, 99(2): 248–254.

Voigtlander, N., and H.-J. Voth. 2013*a*. "How the West "Invented" Fertility Restriction." *American Economic Review*, 103(6): 2227–2264.

Voigtlander, N., and H.-J. Voth. 2013*b*. "The Three Horsemen of Riches: Plague, War, and Urbanization in Early Modern Europe." *Review of Economic Studies*, 80(2): 774–811.

Weir, D.R. 1991. "A Historical Perspective on the Economic Consequences of Rapid Population Growth." In *Consequences of Rapid Population Growth in Developing Countries*. Taylor and Francis.

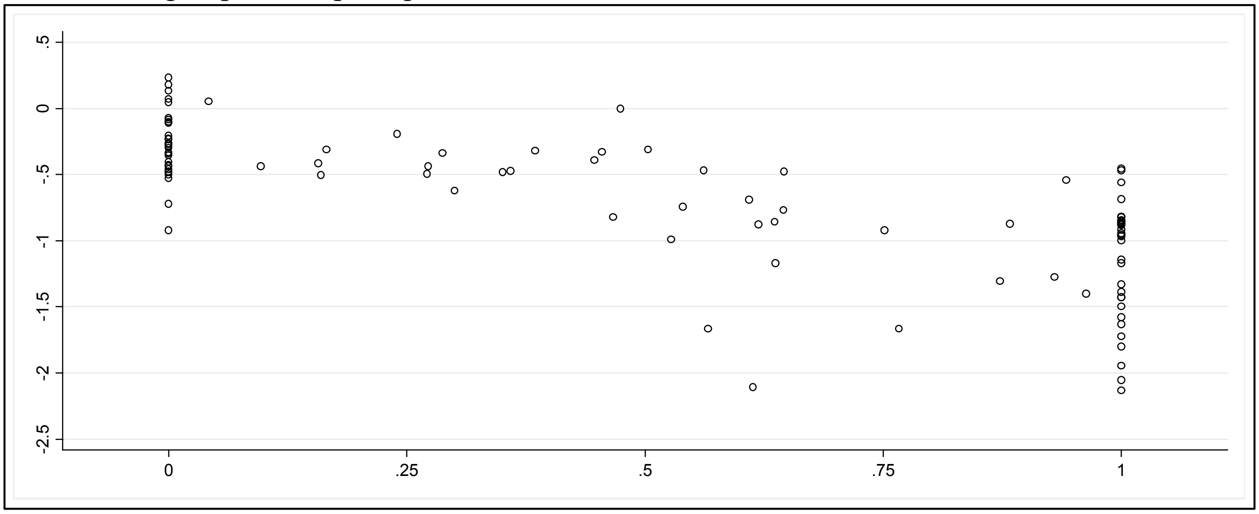
Figure 1. Sample Districts, Shaded by Morisco Population Share in 1609



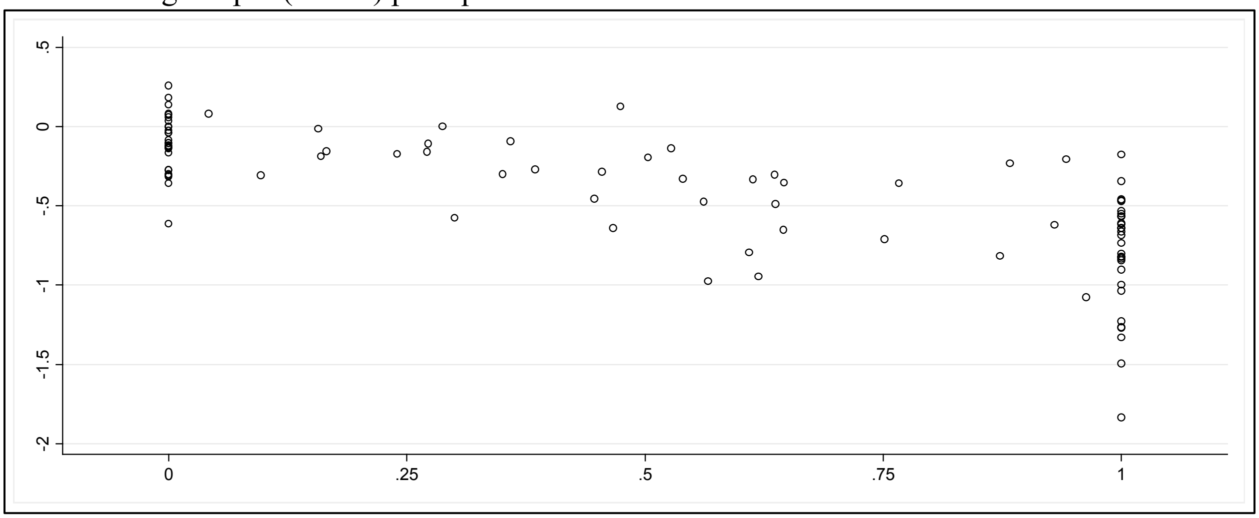
Notes: The 98 sample districts are defined according to tithing areas of the Archbishopric of Valencia in the 17th century. The thin lines create more than 98 distinct polygons because some sample districts are non-contiguous. The population is 0% Morisco in 31 districts (shaded white), between 0% and 100% Morisco in 36 districts (shaded light gray), and 100% Morisco in 31 districts (shaded medium gray). The City of Valencia is in the Northeast, in a cross-hashed non-tithing area, and the coastline is to the East.

Figure 2. Changes in District Outcomes from 1609 to 1622, by Morisco Share in 1609

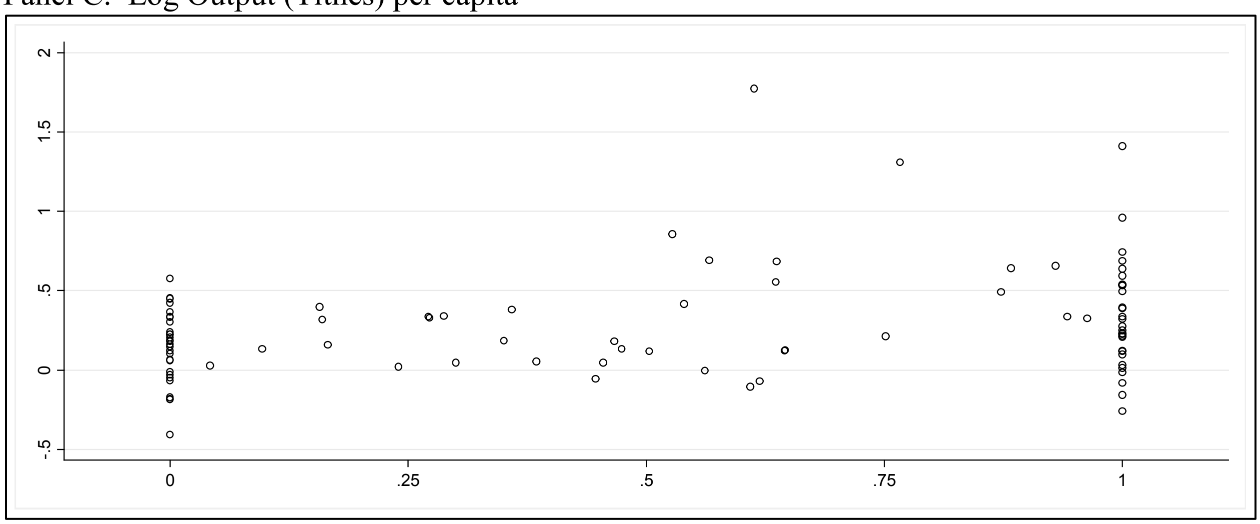
Panel A. Log Population per square kilometer



Panel B. Log Output (Tithes) per square kilometer



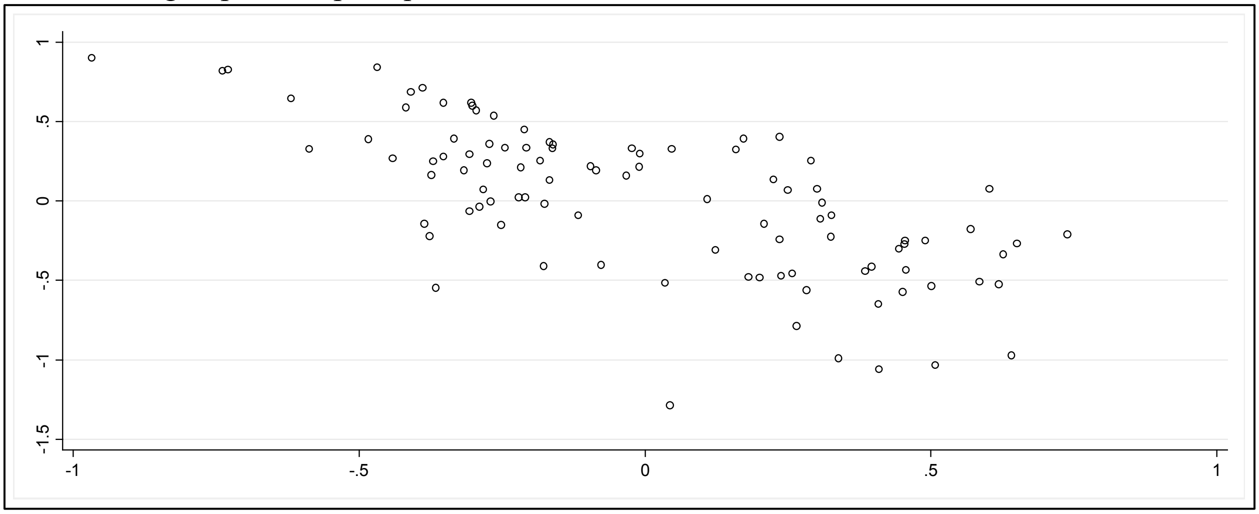
Panel C. Log Output (Tithes) per capita



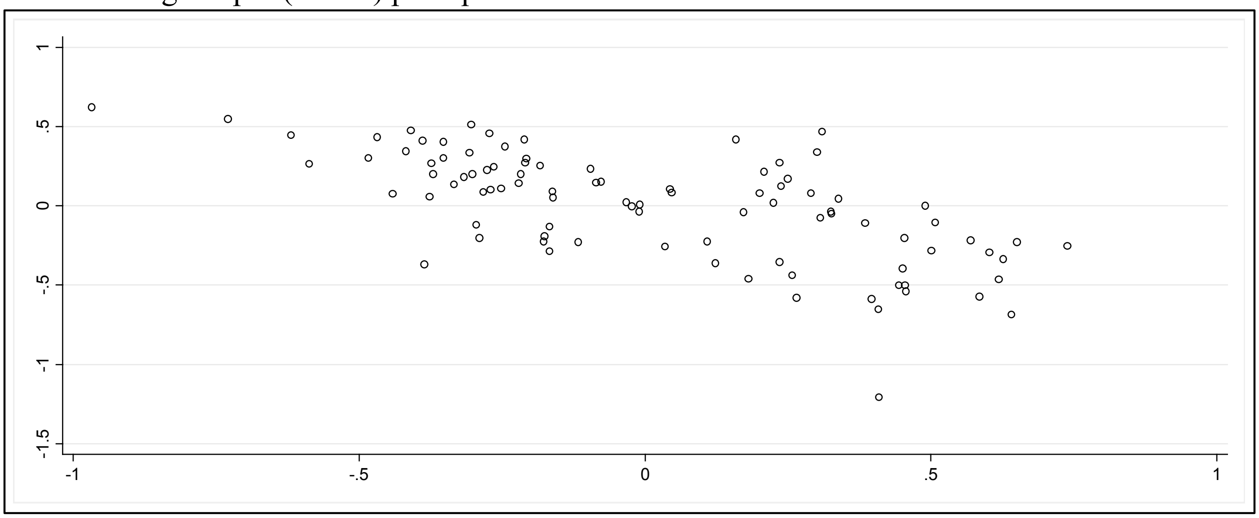
Notes: Each panel plots districts' change in the indicated outcome variable (from 1609 to 1622) against districts' Morisco population share in 1609.

Figure 3. Changes from 1609 to 1622, Controlling for District Geographic Characteristics

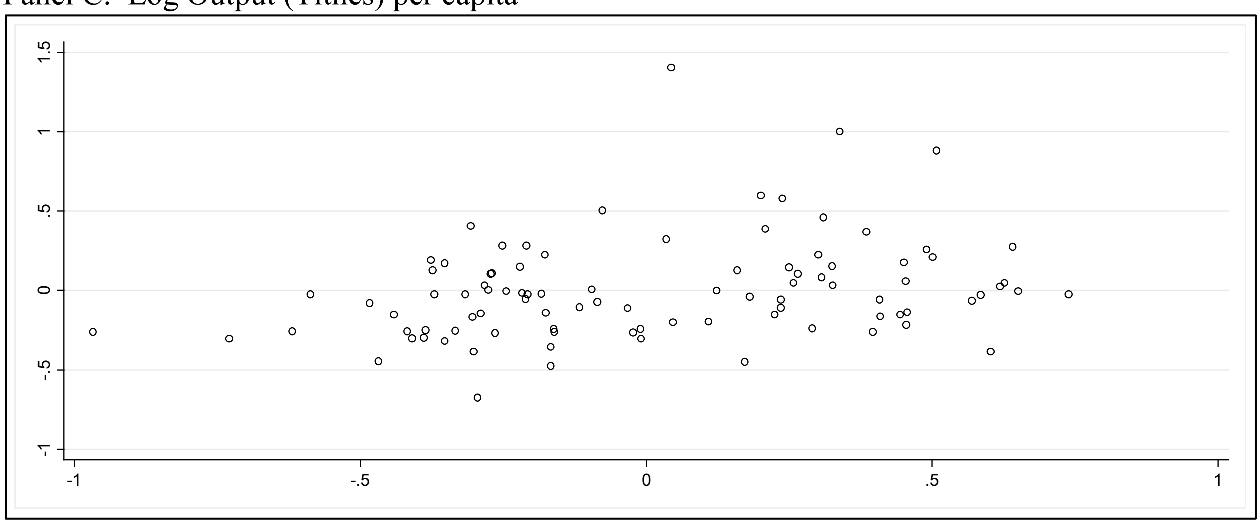
Panel A. Log Population per square kilometer



Panel B. Log Output (Tithes) per square kilometer



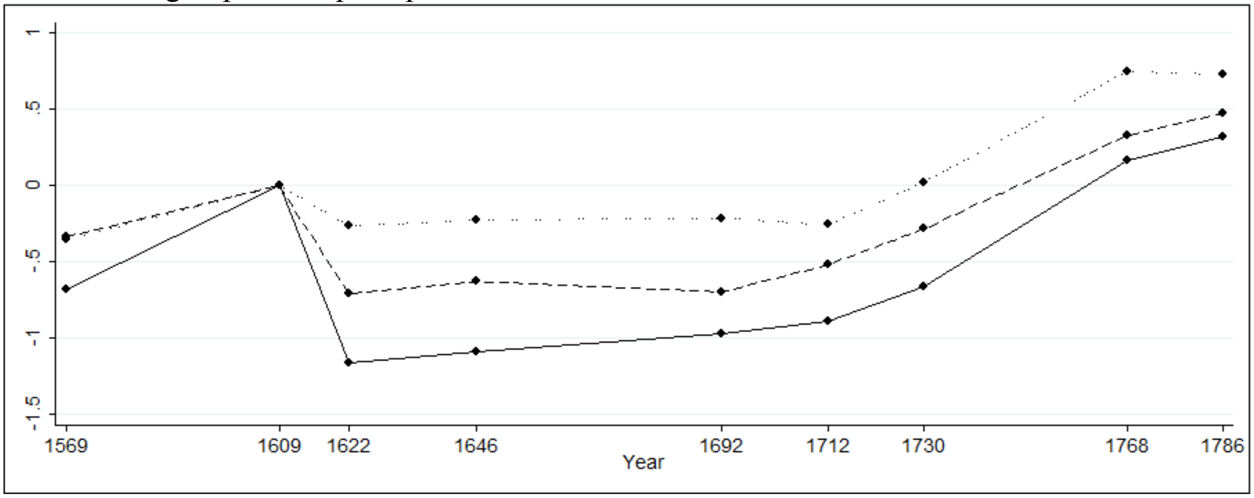
Panel C. Log Output (Tithes) per capita



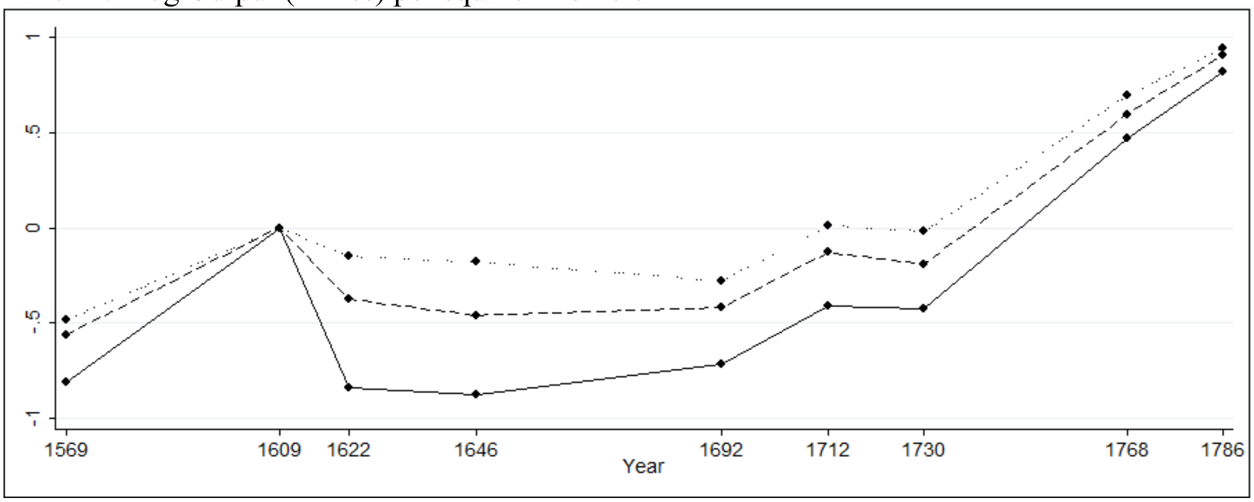
Notes: Each panel plots districts' residual change in the indicated outcome variable (from 1609 to 1622) against districts' residual Morisco population share in 1609, after controlling for districts' seven geographic characteristics.

Figure 4. Changes in District Outcomes, Grouped by Morisco Share in 1609

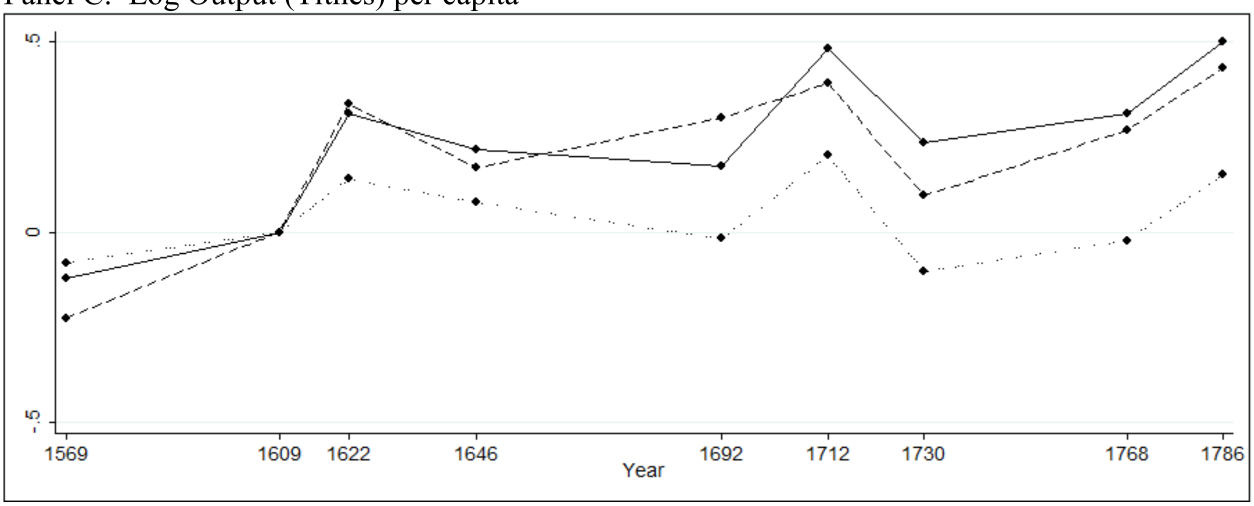
Panel A. Log Population per square kilometer



Panel B. Log Output (Tithes) per square kilometer



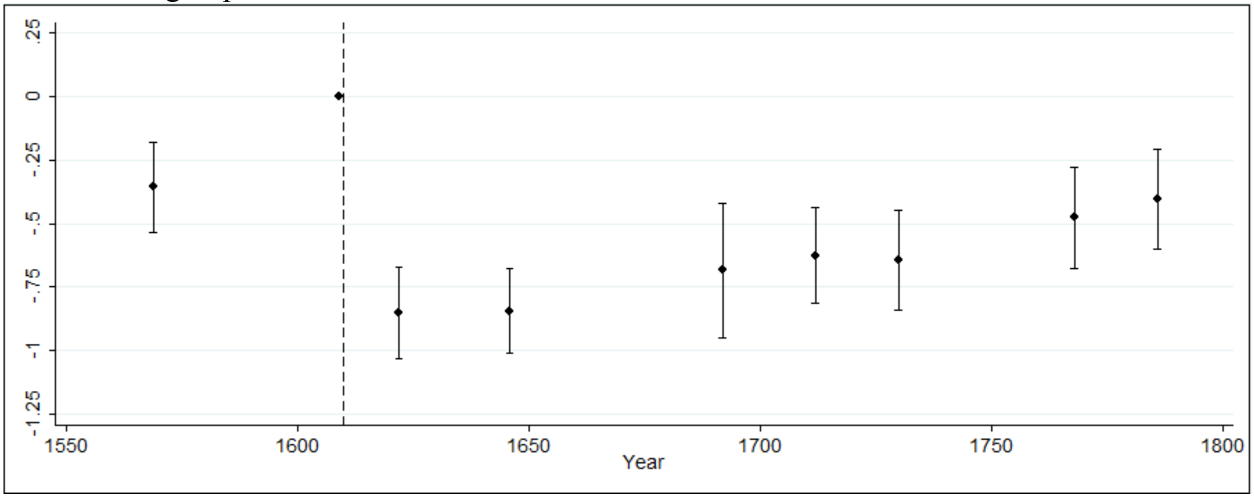
Panel C. Log Output (Tithes) per capita



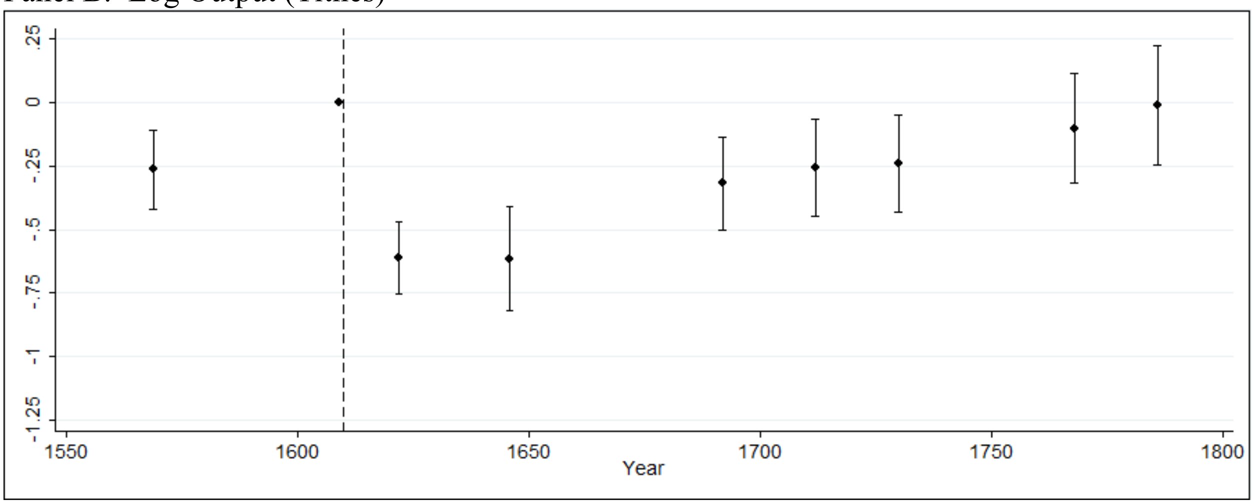
Notes: Each panel plots districts' average change after 1609 in the indicated outcome variable, grouped by districts' Morisco population share in 1609: 0% (dotted line), between 0% and 100% (dashed line), and 100% (solid line).

Figure 5. Estimated Changes in District Outcomes, by 1609 Morisco Population Share

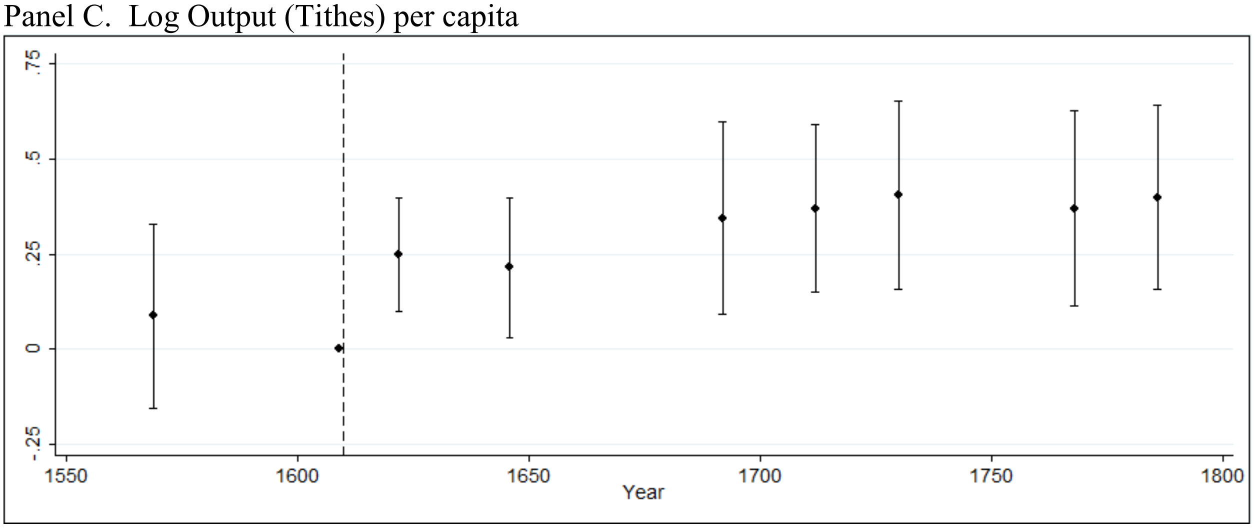
Panel A. Log Population



Panel B. Log Output (Tithes)



Panel C. Log Output (Tithes) per capita



Notes: For the indicated outcome variable: each panel reports estimated changes in a formerly 100% Morisco district, relative to changes in a formerly 0% Morisco district. Estimates are from equation 1 in the text, which controls for fixed effects by district and year and seven geographic characteristics interacted with year. Vertical lines report 95% confidence intervals, aside from in 1609 which is the omitted year normalized to zero.

Table 1. Baseline District Characteristics, by Morisco Population Share in 1609

	Pre-Expulsion	Log Difference by 1609 Morisco Share:	
	Sample Mean	Basic Difference	With Geographic Controls
District Outcome in 1609:	(1)	(2)	(3)
Population per km2	9.13	- 0.496**	- 0.261
	[17.6]	(0.181)	(0.173)
Output per km2	379	- 1.218**	- 0.787**
	[1256]	(0.238)	(0.231)
Output per capita	30.3	- 0.695**	- 0.524**
	[19.4]	(0.127)	(0.121)

Notes: Column (1) reports average district characteristics in 1609 (in levels), and the standard deviation is reported in brackets. Output is measured as the auctioned tithe value (in lliures), multiplied by ten. Column (2) reports the basic difference for each district characteristic (in logs) by the district's Morisco population share in 1609: the coefficients are estimated by regressing the indicated county characteristic on the district's Morisco population share in 1609 (between 0 and 1). Column (3) reports the estimated difference when controlling also for seven geographic characteristics of districts (distance to the City of Valencia, distance to the coast, terrain ruggedness, latitude and longitude, average rainfall, and agricultural suitability). There are 98 districts with population data in 1609 and 96 districts with output data in 1609. Robust standard errors are reported in parentheses: ** denotes statistical significance at 1%, * denotes statistical significance at 5%.

Table 2. Estimated Differences in Morisco Districts, Relative to Differences in 1609

	Population per km2		Output per km2		Output per Capita	
	(1)	(2)	(3)	(4)	(5)	(6)
1569 x Morisco	- 0.358**	- 0.302**	- 0.263**	- 0.302**	0.088	0.010
	(0.091)	(0.076)	(0.079)	(0.078)	(0.123)	(0.109)
1609 x Morisco	0	0	0	0	0	0
1622 x Morisco	- 0.854**	- 0.935**	- 0.613**	- 0.707**	0.248**	0.248**
	(0.092)	(0.092)	(0.072)	(0.075)	(0.076)	(0.075)
1646 x Morisco	- 0.845**	- 0.889**	- 0.615**	- 0.673**	0.215*	0.220**
	(0.085)	(0.094)	(0.105)	(0.106)	(0.094)	(0.083)
1692 x Morisco	- 0.684**	- 0.691**	- 0.318**	- 0.442**	0.344**	0.247*
	(0.136)	(0.105)	(0.094)	(0.094)	(0.129)	(0.110)
1712 x Morisco	- 0.625**	- 0.701**	- 0.258**	- 0.414**	0.370**	0.319**
	(0.096)	(0.100)	(0.098)	(0.100)	(0.113)	(0.104)
1730 x Morisco	- 0.646**	- 0.772**	- 0.241*	- 0.414**	0.404**	0.383**
	(0.101)	(0.100)	(0.097)	(0.095)	(0.126)	(0.108)
1768 x Morisco	- 0.478**	- 0.600**	- 0.102	- 0.265**	0.370**	0.345*
	(0.102)	(0.115)	(0.110)	(0.100)	(0.131)	(0.133)
1786 x Morisco	- 0.404**	- 0.497**	- 0.012	- 0.175	0.398**	0.349*
	(0.101)	(0.108)	(0.119)	(0.111)	(0.124)	(0.133)
Geography controls	YES	NO	YES	NO	YES	NO
Observations	864	864	875	875	858	858
Districts	98	98	98	98	98	98
R-squared	0.945	0.933	0.975	0.969	0.831	0.783

Notes: Columns (1), (3), and (5) report estimates from regressing the indicated outcome variable on a district's Morisco population share in 1609 interacted with year, district fixed effects, year fixed effects, and seven district geographic characteristics interacted with each year (distance to the City of Valencia, distance to the coast, terrain ruggedness, latitude and longitude, average rainfall, and agricultural suitability). Columns (2), (4), and (6) omit the geography-by-year controls. All estimates are interpreted as the difference between Morisco districts and non-Morisco districts in that year, relative to the difference in 1609. Robust standard errors clustered by district are reported in parentheses: ** denotes statistical significance at the 1% level, * at the 5% level.

Table 3. Estimated Impacts on Population Growth from the Moriscos' Expulsion

	OLS		Arellano-Bond GMM		Constrained Regression
	(1)	(2)	(3)	(4)	(5)
Log Population $_{t-1}$	- 0.0330**	- 0.0045**	- 0.0304**	0.0031	- 0.01
	(0.0026)	(0.0009)	(0.0045)	(0.0075)	(-)
1622 x Morisco	- 0.0627**	- 0.0729**	- 0.0654**	- 0.0771**	- 0.0709**
	(0.0074)	(0.0071)	(0.0069)	(0.0080)	(0.0076)
1646 x Morisco	- 0.0249**	- 0.0107**	- 0.0253**	- 0.0084	- 0.0134**
	(0.0034)	(0.0029)	(0.0032)	(0.0050)	(0.0028)
1692 x Morisco	- 0.0213**	- 0.0072*	- 0.0211**	- 0.0040	- 0.0095**
	(0.0041)	(0.0030)	(0.0040)	(0.0057)	(0.0030)
1712 x Morisco	- 0.0169**	- 0.0082	- 0.0175**	- 0.0069	- 0.0097*
	(0.0041)	(0.0045)	(0.0035)	(0.0051)	(0.0044)
1730 x Morisco	- 0.0188**	- 0.0111**	- 0.0194**	- 0.0107*	- 0.0128**
	(0.0043)	(0.0032)	(0.0039)	(0.0047)	(0.0033)
1768 x Morisco	- 0.0132**	- 0.0049	- 0.0137**	- 0.0044	- 0.0067*
	(0.0035)	(0.0028)	(0.0033)	(0.0046)	(0.0027)
1786 x Morisco	- 0.0093*	- 0.0066*	- 0.0103**	- 0.0075	- 0.0073**
	(0.0038)	(0.0026)	(0.0038)	(0.0036)	(0.0026)
District FE	YES	NO	N/A	N/A	YES
Hansen *J* test			[0.061]	[0.415]	
AR(2) test			[0.007]		
AR(3) test				[0.264]	
Observations	757	757	653	653	757
Districts	98	98	98	98	98
R-squared	0.859	0.782			
Pooled Effect (1646 - 1786)	- 0.0170**	- 0.0081**	- 0.0177**	- 0.0076*	- 0.0099**
	(0.0030)	(0.0018)	(0.0027)	(0.0034)	(0.0017)
F -test: Equality of Coefficients (1646 - 1786)	[0.007]	[0.456]	[0.002]	[0.457]	[0.316]
100-year Trend (1646 - 1786)	0.0106**	0.0030	0.0103**	0.0018	0.0042
	(0.0029)	(0.0023)	(0.0027)	(0.0023)	(0.0022)

Notes: Except as noted below, each column reports estimates from regressing the annualized growth rate in population on the lagged level of population, the district's Morisco population share in 1609 interacted with year, district fixed effects, year fixed effects, and seven district geographic characteristics interacted with each year (distance to the City of Valencia, distance to the coast, terrain ruggedness, latitude and longitude, average rainfall, and agricultural suitability). Column (1) is our baseline specification, whereas Column (2) omits distict fixed effects. Column (3) implements an Arellano-Bond GMM estimator using all further lagged values of population as instruments, and Column (4) omits the twice-lagged values as instruments. Column (5) constrains the impact of lagged population to be -0.01. Robust standard errors clustered by district are reported in parentheses: ** denotes statistical significance at the 1% level, * at the 5% level.

For the 6 year-specific Morisco coefficients between 1646 and 1786, the table reports: the estimated average coefficient; a F-test on these coefficients' equality; and the estimated 100-year change in coefficients.

Table 4. Estimated Impacts on Output Growth from the Moriscos' Expulsion

	OLS		Arellano-Bond GMM	Constrained Regression	SUR: T4c1 - T3c1
	(1)	(2)	(3)	(4)	(5)
Log Output $_{t-1}$	- 0.0214**	- 0.0012**	- 0.0099*	- 0.01	
	(0.0022)	(0.0004)	(0.0045)	(-)	
1622 x Morisco	- 0.0483**	- 0.0540**	- 0.0515**	- 0.0516**	0.0144*
	(0.0056)	(0.0056)	(0.0054)	(0.0058)	(0.0058)
1646 x Morisco	- 0.0141**	- 0.0076*	- 0.0106**	- 0.0104**	0.0107**
	(0.0036)	(0.0030)	(0.0032)	(0.0032)	(0.0036)
1692 x Morisco	- 0.0081**	- 0.0012	- 0.0044	- 0.0043	0.0132**
	(0.0023)	(0.0028)	(0.0023)	(0.0022)	(0.0034)
1712 x Morisco	- 0.0052	- 0.0042	- 0.0048	- 0.0048	0.0117**
	(0.0030)	(0.0029)	(0.0025)	(0.0029)	(0.0042)
1730 x Morisco	- 0.0060*	- 0.0062*	- 0.0063*	- 0.0062*	0.0128**
	(0.0028)	(0.0029)	(0.0024)	(0.0027)	(0.0044)
1768 x Morisco	- 0.0029	- 0.0035	- 0.0034	- 0.0033	0.0103**
	(0.0025)	(0.0021)	(0.0019)	(0.0021)	(0.0033)
1786 x Morisco	0.0014	- 0.0020	- 0.0007	- 0.0006	0.0107**
	(0.0038)	(0.0036)	(0.0034)	(0.0036)	(0.0039)
District FE	YES	NO	N/A	YES	
Hansen *J* test			[0.212]		
AR(2) test			[0.809]		
Observations	773	773	674	773	
Districts	98	98	98	98	
R-squared	0.852	0.792			
Pooled Effect (1646 - 1786)	- 0.0057**	- 0.0041*	- 0.0045*	- 0.0049**	
	(0.0022)	(0.0020)	(0.0018)	(0.0019)	
F -test: Equality of Coefficients (1646 - 1786)	[0.005]	[0.282]	[0.088]	[0.086]	
100-year Trend (1646 - 1786)	0.0099**	0.0025	0.0063*	0.0056**	
	(0.0025)	(0.0019)	(0.0025)	(0.0021)	

Notes: Except as noted below, each column reports estimates from regressing the annualized growth rate in output per km2 on the lagged level of output, the district's Morisco population share in 1609 interacted with year, district fixed effects, year fixed effects, and seven district geographic characteristics interacted with each year (distance to the City of Valencia, distance to the coast, terrain ruggedness, latitude and longitude, average rainfall, and agricultural suitability). Column (1) is our baseline specification, whereas Column (2) omits distict fixed effects. Column (3) implements an Arellano-Bond GMM estimator using all further lagged values of output as instruments. Column (4) constrains the impact of lagged output to be -0.01. Robust standard errors clustered by district are reported in parentheses: ** denotes statistical significance at the 1% level, * at the 5% level.

For the 6 year-specific Morisco coefficients between 1646 and 1786, the table reports: the estimated average coefficient; a F-test on these coefficients' equality; and the estimated 100-year change in coefficients.

Column (5) reports the difference between Morisco coefficients in column (1) of this Table and Table 3.

Table 5. Estimated Impacts on Output per Capita Growth from the Moriscos' Expulsion

	OLS		Constrained Regression	Arellano-Bond GMM	
	(1)	(2)	(3)	(4)	(5)
Log Output per Capita $_{t-1}$	- 0.0324**	- 0.0085**	- 0.01	- 0.0374**	- 0.0354**
	(0.0025)	(0.0017)	(-)	(0.0034)	(0.0035)
1622 x Morisco	0.0175**	0.0204**	0.0189**	0.0170**	0.0181**
	(0.0060)	(0.0063)	(0.0069)	(0.0053)	(0.0054)
1646 x Morisco	0.0053	0.0018	0.0022	0.0055	0.0068
	(0.0039)	(0.0037)	(0.0039)	(0.0037)	(0.0039)
1692 x Morisco	0.0079*	0.0057	0.0053	0.0081*	0.0098**
	(0.0035)	(0.0035)	(0.0040)	(0.0034)	(0.0035)
1712 x Morisco	0.0099*	0.0047	0.0048	0.0106*	0.0120**
	(0.0048)	(0.0049)	(0.0055)	(0.0045)	(0.0046)
1730 x Morisco	0.0119*	0.0059	0.0056	0.0131**	0.0146**
	(0.0050)	(0.0044)	(0.0047)	(0.0051)	(0.0054)
1768 x Morisco	0.0097*	0.0028	0.0039	0.0110*	0.0125**
	(0.0040)	(0.0034)	(0.0034)	(0.0043)	(0.0047)
1786 x Morisco	0.0122**	0.0066	0.0073	0.0132**	0.0148**
	(0.0046)	(0.0039)	(0.0042)	(0.0045)	(0.0047)
District FE	YES	NO	YES	N/A	N/A
Hansen *J* test				[0.131]	[0.390]
AR(2) test				[0.668]	[0.406]
Observations	747	747	747	642	642
Districts	98	98	98	98	98
R-squared	0.671	0.481			
Pooled Effect (1646 - 1786)	0.0094**	0.0046	0.0048	0.0094**	0.0107**
	(0.0033)	(0.0025)	(0.0026)	(0.0033)	(0.0035)
F -test: Equality of Coefficients (1646 - 1786)	[0.728]	[0.847]	[0.943]	[0.551]	[0.498]
100-year Trend (1646 - 1786)	0.0043	0.0019	0.0024	0.0049	0.0050
	(0.0030)	(0.0023)	(0.0025)	(0.0030)	(0.0029)

Notes: Except as noted below, each column reports estimates from regressing the annualized growth rate in output per capita on the lagged level of output per capita, the district's Morisco population share in 1609 interacted with year, district fixed effects, year fixed effects, and seven district geographic characteristics interacted with each year (distance to the City of Valencia, distance to the coast, terrain ruggedness, latitude and longitude, average rainfall, and agricultural suitability). Column (1) is our baseline specification, whereas Column (2) omits distict fixed effects. Column (3) constrains the impact of lagged output per capita to be -0.01. Column (4) implements an Arellano-Bond GMM estimator using all further lagged values of output per capita as instruments, and Column (5) constrains the further lagged values of output per capita to have the same impact in each year. Robust standard errors clustered by district are reported in parentheses: ** denotes statistical significance at the 1% level, * at the 5% level.

For the 6 year-specific Morisco coefficients between 1646 and 1786, the table reports: the estimated average coefficient; a F-test on these coefficients' equality; and the estimated 100-year change in coefficients.