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Abstract: The twentieth century United States provides a natural experiment to measure the strength and persistence of entrepreneurial cultures. Assuming immigrants bear the cultures of their birth place, comparison of revealed entrepreneurial propensities of US immigrant groups in 1910 and 2000 reflected these backgrounds. According to this test North-western Europe, where modern economic growth is widely held to have originated, did not host unusually strong entrepreneurial cultures. Instead such cultures were carried by persons originating from Greece, Turkey and Italy, together with Jews. The rise of widespread female entrepreneurship provides additional evidence by showing that this trait systematically responded less strongly, but in the same way, to cultural background as did male entrepreneurship.

Measurement of entrepreneurial culture requires distinguishing between motivation and opportunity. Opportunities depend on national institutions; the legal environment and costs of setting up a firm strongly influence differences in business start-up rates between countries (Klapper, Laeven and Rajan 2006; Ciccone and Papaioannou 2007). Capital or credit rationing may also determine prospects for entrepreneurship (Black, De Meza and Jeffries 1996; Blanchflower and Oswald 1998). Motivations on the other hand are determined by preferences, but likely to be swayed by the national and regional environment as well (Beugelsdijk 2007). Unlike opportunities however, motivations can be established by surveys. Large proportions of workers state that they would prefer to be self-employed (Blanchflower, Oswald and Stutzer 2001). So the very wide variation between nations in percentages favouring self-employment may indicate either differences in frustrated aspirations, or a broad range of national entrepreneurial motivations, or both. The present study aims to identify motivation, as determined by national culture, more precisely by controlling for opportunity over the twentieth century.

Some plausible assumptions allow the United States to be a natural experiment for separating entrepreneurial culture from national institutions. If immigrants bear the traditions of their birth place, comparison of revealed entrepreneurial propensities of US immigrant groups will reflect these backgrounds. In the common institutional environment differential entrepreneurial behaviour by origin depends upon culture so long as certain conditions are met. Three of these conditions are:

(i)   the absence of selection processes favouring, or discriminating against, emigration of entrepreneurial types from a particular state,

(ii)   that country of origin is an indicator of entrepreneurial culture, and

(iii)   that non-cultural systematic differences between origin countries do not bias the choice of entrepreneurship.

'Selection processes', such as the 1882 Chinese Exclusion Act operating at the beginning of the last century, are usually well known and to some extent can be taken into account. A working assumption is that cultural heterogeneity is greater between origin countries than within them, but obvious exceptions are noted. In addition whether a source country's level of development or regulatory environment, rather than culture, predisposed the entrepreneurial tendencies of migrants can be tested.

The natural experiment shows that North-western Europe, where modern economic growth is widely believed to have originated, did not host unusually entrepreneurial cultures, rather the reverse in the case of England. On the other hand two groups, Greeks and Jews, revealed strong and persistent entrepreneurial tendencies in both benchmark years and therefore, it may be assumed, throughout the twentieth century. Cultural change, that by the end of the century had initiated widespread female entrepreneurship, also ensured that this trait responded less strongly to the origin background. Females from more entrepreneurial cultures were less entrepreneurial than males but those from less than averagely entrepreneurial source countries were more so. Nonetheless females showed qualitatively similar traits by origin as males at the end of the twentieth century.

Section 1 explains the idea and measures of entrepreneurial culture chosen, Section 2 sets out the model of entrepreneurship and culture, Section 3 describes the historical processes generating the immigrant samples, Section 4 discusses the extent to which the United States constituted 'a level playing field' for the groups studied and possible tests, and Section 5 presents the results of the analysis.

Entrepreneurial Culture

For present purposes culture is the common ways of thinking created by shared belief systems, similar ways of earning a living, and mutual educational arrangements. In the language of neoclassical economics, culture is a form of collective taste or preference. Because human beings cannot make absolute judgments, they draw comparisons from their environment, from the past or from their expectations of the future to make their choices (Stutzer 2004). Their culture as defined is therefore likely to influence their behaviour. Persistence of culture in this light is a prerequisite for rational (consistent) choice.

Culture then consists of beliefs and values transmitted 'fairly unchanged' from generation to generation (Guiso et al 2006). The pace of cultural change is judged sufficiently slow to convince some that culture is a fundamental force in economic history (Landes 1998 516-7). 'Anglo-Saxon' culture was important in the past for economic development and Japanese 'collectivism' is supposedly the wave of the future (Temin 1997).

An alternative view is that although cultures seem 'sticky' they can be 'fluid'. (Jones 2006 Ch 2). Most business culture literature overstates cultural stability and persistence because it consists of snapshots of social behaviour and attitudes, according to Eric Jones (2006 258). In the long run culture will probably respond to historical events, be moulded by institutions and transformed by economic development. But over shorter periods culture may be sufficiently enduring to act as a predetermined variable in a model of entrepreneurship.

National cultures are often heterogeneous; even in the twenty-first century. Armenian immigrant entrepreneurs were prominent in many countries at different periods of history without an Armenian 'country of origin' (Godley 2006). Again, numbers of Greeks living outside Greece in the first decade of the twentieth century were much greater than those within the country and Greek migration

from Ottoman-dominated areas, especially for political reasons, was common (Salutos 1964 16, 23, 33). Further north, migrants from the Russian Empire and Poland in the years before the First World War are very likely to have been Jews because of the anti-Jewish Pogroms from the 1880s. Nonetheless in the absence of information about specific relevant fractionalisation or events, the assumption which is tested here is that the country of origin is an indicator of distinctive entrepreneurial culture[1].

An operational definition of entrepreneurship is needed to identify supportive or detrimental cultures. An entrepreneur is one who takes riskier decisions for greater rewards, exploiting opportunities that others have not noticed (Kirzner 1973; Casson 2003). Becoming an employer is an entrepreneurial act in the sense that it involves taking on risk. It also necessitates being innovative, to the extent that setting up any business requires looking for a gap in the market, however narrowly defined. A measure of entrepreneurial culture is therefore the tendency of members of a large group to become employers, rather than employees.

A stronger entrepreneurial culture may not always predict more <u>successful</u> entrepreneurship. For the constraints within which choices are exercised also affect outcomes. Individuals inheriting a highly entrepreneurial culture are simply more likely to use their initiative and ingenuity. How successful they are, and whether they do this in politics, crime or legitimate business, will be determined by institutions, resources and history, among other factors (Baumol 1990).

We employ two measures of enterprise which may be taken respectively as upper and lower bound estimates. The first is simply the chances of a member of the immigrant group being an employer – relative to other groups. Even though migrants may be exceptional in their originating country, each immigrant group will be exceptional to the same extent, unless there are historically unusual 'push' factors that must be identified qualitatively. Economic costs of movement differ by original location, as does the strength of the push factor but normally these will only affect the relative volumes of migrant groups. Persecution may be a reason to migrate for large numbers. Yet only when this or other processes select the more or less entrepreneurial from a country does it affect the present 'experiment'.

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[1] A test of city- or region- based culture, as well as that of a nation, would be an interesting but a considerably larger project.

We do not compare immigrants with those born in US (as for instance does Lofstrom 2002) but with each other. The US-born are more likely to inherit a family business, which also takes individuals into the employer category. Migrant self-employment through inheritance by contrast is unlikely and is probably in start-ups.

The entrepreneurship ratio does not take into account differences among the migrants in characteristics that might influence entrepreneurship independently of culture. Those from some origin countries were more likely than others to be literate at the beginning of the twentieth century. Such migrants might be relatively highly entrepreneurial because of these attributes, whereas purely for cultural reasons they might be less entrepreneurial than those who were illiterate.

Whether the ratio measure is appropriate depends on what is assumed culturally determined. It could be contended that education and literacy, like entrepreneurship, depend upon culture. They are not independent variables but endogenous in the occupational choice model that includes culture. If so their inclusion would lead to an underestimation of the contribution of culture, and the true cultural measure is simply the unadjusted chances of entrepreneurship. But when literacy, wealth and other variables are not culturally determined, our second measure is appropriate; the chance of becoming an employer, holding constant a range of other influences on the outcome.

Modelling Culture and Occupational Choice

Becoming an entrepreneur usually needs capital, which may need accumulating first. Then during earlier periods the would-be entrepreneur works for wages and saves. In later years, when those who continue to opt for wage work or leisure can live off the interest on their savings, the entrepreneur puts the savings into the business (for example Evans and Jovanocic 1989; Xu 1999). Cultures that emphasise deferred gratification, that favour a low rate of time discount, will encourage savings, and may boost entry to entrepreneurship by bringing forward the date at which the minimum capital for the business start is achieved.

Another economic impact of culture is through transactions costs. If buyers and sellers believe they can trust each other, insurance, monitoring and enforcement costs can be markedly reduced, boosting the volume of transactions, and therefore

the gains from trade. Mark Casson (1991) divides business cultures between those with low and high trust. A high trust business culture is likely to stimulate lower vertical integration because direct control within the firm is less necessary than in a low trust culture, for arms-length market relations are relatively reliable. Business entrepreneurship too will more probably flourish where agreements are expected to be honoured.

Culture may also impinge upon the supply of effort. Since entrepreneurship requires considerable commitment of time and energy (the self-employed work longer hours than the employed (Blanchflower and Shadworth 2007)), a culturally transmitted work ethic could well influence the supply of entrepreneurship.

Deciding to become an entrepreneur requires a comparison of certain waged employment (paying w) and rentier income from assets (A) with uncertain entrepreneurial income (π) A critical feature of entrepreneurship is therefore taking on risk and the agent's risk attitude (α) (Kihlstrom and Laffont 1979). The occupational choice turns on a judgement about the difference (Y) between the uncertain wellbeing from self-employment, $E(U)$, and that from paid employment:

$$(1) \qquad Y^* = E\big(U\big(A+\pi,\alpha\big)\big) - U\big(A+w,\alpha\big)$$

Risk attitudes may be culturally influenced and the willingness to make risky choices will also depend upon cultural features such as family support networks. For given risk attitudes, a person with a higher income is more willing to accept a gamble of a given size. The subjective cost of an uncertain prospect, relative to the expected value of this payoff, is lower the larger is the income at which it is offered. Hence the rich are more likely to accept a given bet than the poor, and are therefore more probably entrepreneurial on these grounds.

This conclusion only holds though when the basis for comparison is the same; that is both the rich and the poor have equal access to safe incomes as an alternative to entrepreneurship. More commonly, the better off will face a wider range of options. Insofar as entrepreneurship is time-consuming, and leisure is a normal good, the rich will be <u>less</u> likely to opt for this occupation. The relative impacts of leisure preference, risk attitudes and the personal capital requirement for business starts then determine how wealth and income affect the decision to become an entrepreneur.

In terms of equation (1) leisure preference and time preference can be considered as additional dimensions of α. If both utility functions in (1) are linear functions of a characteristics vector $\mathbf{X}$:

$$(2) \qquad Y^* = \mathbf{X}'\mathbf{b} + \varepsilon$$

where $\mathbf{b}$ is a vector of parameters and ε is a normally distributed disturbance term with zero mean and unit variance. Although Y^* cannot be measured directly, the decisions made as a consequence of it can be. An individual chooses entrepreneurship ($Y = 1$) when $Y^* \geq 0$ and can be seen to do so. Alternatively the person opts for waged employment ($Y = 0$) when $Y^* < 0$, which is equally observable. For individual i then,

$$(3) \qquad \Pr\left[Y_i = 1\right] = \Pr\left[Y_i^* \geq 0\right] = f\left(\mathbf{X}'\mathbf{b}\right)$$

The key variable in the $\mathbf{X}$ vector is country of origin, a measure of immigrant culture, the α of equation (1). Even with a broad definition of culture the need to acquire savings and work experience at first increases entrepreneurship with age, and perhaps eventually diminishes it (Parker 2004). Information about entrepreneurial opportunities is likely to increase with duration of immigrants' residence in the United States, and with ability to speak English. Both elements of the $\mathbf{X}$ vector would then raise the likelihood of becoming an entrepreneur. As noted already, an entrepreneur's personal wealth, either as a result of savings or inherited, is typically necessary to provide the equity in the new business - for start up capital. By increasing awareness of opportunities, formal education, or in earlier periods literacy, could increase entrepreneurial chances.

Entrepreneurship may be perceived as a better way of providing more income than wage employment and families can be expensive. In such circumstances marriage increases the likelihood of choosing to become an entrepreneur[2]. Some migrants intend to return to their country of origin and these are less likely to make the commitment of starting a business. Marriage may encourage such commitment, which would also be signalled by 'naturalisation'. Gender will probably influence the chances of becoming an entrepreneur as well, particularly in earlier periods. To allow that work experience influences entrepreneurial choice we also control for different sectors in which employment or self-employment

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[2] Siqueria's (2007) analysis of the US 2000 census for Brazilian immigrants find that being married increases the chances of owning their own business.

takes place. Greater expected rewards will increase the likelihood of an individual becoming an entrepreneur. This provides a link of the entrepreneurial supply with the demand or opportunities for entrepreneurship that have not been considered so far.

Apart from the contribution of common (US) institutions, the opportunities for entrepreneurship depend on industry entry barriers or their absence. Barriers now are lowest in the wholesaling, retailing and construction industries. Finance and business services also offer high returns sometimes without high barriers. These opportunities, reflected in high expected returns, directed the supply of entrepreneurs.

Substituting out expected returns form both entrepreneurial supply and opportunities yields a reduced form equation of the probability that an individual would become an entrepreneur:

$$\Pr[Y = 1] = f(\textbf{\textit{gender, marital status, residence duration,}} \\ \textbf{\textit{formal human capital, English speaking,}} \\ \textbf{\textit{sector, age, wealth, culture}})$$

With this equation two hypotheses can be tested. The first is that entrepreneurial cultures (generally estimated from country of origin) make a difference to behaviour. The second hypothesis is that entrepreneurial cultures persist for long periods.

The US Immigrant Samples

The central idea is that to isolate the impact of culture from that of institutions on the business start-up rate, we can consider how those brought up in one country perform in a social and economic environment where institutions and market opportunities are different- the United States. During the twentieth as well as the nineteenth centuries, immigrants from a wide range of cultures arrived in the common environment of the United States and some of them started their own businesses. Cultural persistence here is the stability of entrepreneurial or start-up propensities between the 1910 and 2000 US Censuses[3].

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[3] 5 percent samples from IPUMS (http://usa.ipums.org/usa/). 1910 is the first year that the employer/ employee question is asked.

Agricultural employment is excluded from the sample because opportunities and conditions were so different from other sectors. The sample is also restricted to origins from which migrants were quite numerous in 1910 in order to make the comparison over time more consistent. For instance Koreans were not included because, although sufficiently numerous in 2000, in 1910 there were too few working as employers outside agriculture. But the highly entrepreneurial Middle East was disaggregated subsequently to examine whether particular sources were driving the result[4]. Persons 'working on own account' in the early period, and 'unincorporated business' in the later period, are left out of the entrepreneurial category because they could be associated with casual work. Instead we focus on employers and incorporated businesses, on the grounds that these groups match more closely with the theoretical concept of an entrepreneur.

During the period leading up to 1910, migrants were generally not 'filtered' or selected by the host country. So origins of immigrants to the US at different times varied mainly with the strength of 'push factors' in source countries. During the 1840s harvest failure thrust large numbers of German and Irish migrants across the Atlantic, while persecution of Jews triggered another wave of migrants from Russia and Poland beginning in the 1880s. Population growth coupled with weak economic development encouraged increasing migration from southern and eastern Europe in the 1890s. Population growth too played a part, along with expanding demand for agricultural labour, in swelling Mexican immigration in the first decade of the twentieth century.

The one major exception to free entry was the Chinese Exclusion Act of 1882, which allowed Congress to suspend general Chinese immigration. Although the Act refused entry to Chinese skilled and unskilled labourers and Chinese employed in mining, Chinese nationals with $1000 were still allowed into the United States as 'merchants' (Lee 1960 p79) - a condition highly relevant to their entrepreneurial characteristics. Later, and probably too late to influence substantially the present natural experiment, the 'Gentleman's Agreement' of 1907-08 blocked unskilled Japanese migration to the US, when the Japanese government agreed not to issue passports to labourers (Ichihashi 1932 Ch 16). With the Chinese exception, 1910 is therefore a good year in which to conduct the experiment.

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[4] The base case in the analysis is 'other North America'.

The period of relatively open immigration ended shortly afterwards. In 1924 the Immigration Act limited the number of immigrants who could be admitted from any country to two percent of the number of people from that country who were already living in the United States in 1890. Another major policy change came with the Immigration and Nationality Act of 1965 (becoming law in 1968) which abolished the national origin quotas but introduced Western and Eastern hemisphere quotas.

Liberalisation continued with the Immigration Act of 1990. After the Act, the United States admitted 700,000 new immigrants annually, an increase of 200,000. The new legislation continued to give preference to immigrants with family members already in the United States. Consequently the past stock of immigrants and quota sizes were extremely influential in determining the country of origin of US immigrants in the years after the Act (Clark, Hatton and Williamson 2007). Is this likely to bias the degree of entrepreneurship of migrants relative to those in their country of origin?

A Level Playing Field?

Migration might be selective by entrepreneurial predisposition according to the level of development for a number of reasons. Perhaps migrants from poorer countries were less able to found businesses because they lacked the skills appropriate to a more advanced economy. Alternatively they might be disproportionately forced in to self-employment because of the same deficiencies. Another hypothesis is that poorer people, lacking in financial resources, might migrate from richer countries and richer people from poorer countries. If resources were not adequately controlled in our model (by property ownership), and were necessary to entrepreneurship (as our model parameter estimates indicate) then behaviour attributable to the national level of development would incorrectly be identified as a cultural effect.

A rather different selection process could operate with similar impact if some origin countries' institutions affecting entrepreneurship (rather than wage earners) were less favourable than others and therefore disproportionately more entrepreneurial types emigrated. Again, labour market discrimination against or in favour of particular migrant groups possibly crowded immigrants selectively by origin into entrepreneurship. In the late 19th century Union branches spread

internationally, controlling jobs in certain sections of industry on behalf of those from higher income economies (Foreman-Peck 1992)[5]. Migrants from newer source countries would be hard pressed to find work in these sectors. More generally, (and perhaps an implication of Hatton and Leigh 2007) 'pioneer immigrants' may have been less accepted in the employment market and so more often pushed into self-employment. If for whatever reason labour markets were segmented by national origin, the consequential lower wages of new immigrant groups may have favoured entrepreneurial choice in these groups (creating 'sweat shops' for instance). A new immigrant entrepreneur employing members of the same community could pay lower wages than prevailed in the wider host community and would thereby achieve a competitive advantage.

Wages undoubtedly did differ between migrant groups before the First World War. Hatton's (2000) measurement of immigrant earning power, translated as 'immigrant quality', shows Jews among the highest earners before 1914, with coefficients identical to those of the Dutch and Finnish. Jewish immigrants were also highly entrepreneurial in both London and New York in the generation before the First World War (Godley 2001) - not what would be expected if high Jewish wages discouraged Jewish entrepreneurial choices. By contrast migrants from Syria and Turkey recorded the largest ethnic handicap in wage earning. Jewish, Turkish and Syrian originating migrants all were among the most entrepreneurial but their wage positions (and presumably therefore their skills) in the US market differed markedly. This is inconsistent with at least one version of 'entrepreneurial bias'.

Once the particular migration stream became integrated into the host culture, or better accepted by the host community, they were more able to slot into paid employment if they wished[6]. Market segmentation of given migrant groups probably could not persist over three generations. New migrants groups in 1910 could not be new in 2000 as well. Hence a fundamental test of culture versus labour market barriers is persistence or otherwise of behaviour across the twentieth century when most conditions changed. A common value for the culture estimate at the two dates must imply either that identical conditions somehow persisted or replaced each other, or that they were not of fundamental importance

in both periods. However it does not follow that if the culture estimates are different at the two dates that culture was not important on both occasions.

To summarise, the 'playing field' for migrants may not have been level because of different GDPs per capita in origin countries, because of unusually unfavourable (or favourable) source country institutions for entrepreneurship, or because newer immigrant groups suffered more labour market discrimination. Critically though, because of the selection of similar migrant groups in the year 2000 as in 1910, this last possibility is very unlikely for the second year. In experiments below we assess the importance of the other possible sources of bias.

Results

Entrepreneurial Chances

Entrepreneurial chances are the simplest, and almost certainly biased, measure of entrepreneurial culture, but nonetheless are informative as descriptive statistics. Consistent with Max Weber's (1905) doctrine, US immigrants from the 'Catholic group' of countries (Table 1) – Italy, Mexico, Portugal and Ireland in 1910 are near the bottom of the ranking of probabilities or ratios, but a contrary finding is that Spain and Cuba are near the top. The highest chances in 1910 are those of China (which was subject to special influences already noted), Spain, Germany, Greece and the Netherlands, followed by the Russian empire (the majority of migrants from which were Jewish refugees).

In the year 2000 (Table 1), the top four entrepreneurial groups are those originating from Israel, Greece, Syria and Lebanon[7], and Italy. The position was broadly similar in contemporary Australia (in 1996) (Collins 2003). Judged by the criterion of comparable entrepreneurial proportions at both dates[8], Mexico, Cuba, Netherlands, Sweden, Turkey and Japan show stability, or persistence of entrepreneurial culture. Greece and Italy increase entrepreneurship probabilities substantially, as does Austria (with different boundaries). The ratios for Portugal and Ireland also rise. Migrants from England, Scotland, France, Spain and Germany were less entrepreneurial at the end of the century than at the beginning.

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[7] Syria and Lebanon were also the most highly entrepreneurial in 1910 but the sample available was judged too small to report.

Overall the chances of entrepreneurship decline from 5.1% in the 1910 sample to 3.2% in the 2000 sample because of the massive increase in Mexican immigration with a low entrepreneurial ratio.

Could this pattern stem from the level of development of the source country (GDP per capita), from source country institutions or from the number of migrants already sent, say, two generations before 1910? Neither GDP per capita, joint stock companies per head (the institutions proxy) nor size of established migrant community is a significant predictor of the entrepreneurship ratio (Table 2). In 1850 the largest migrant group came from Ireland (unentrepreneurial in 1910) and the second largest from Germany (with a high entrepreneurial ratio in 1910).

A more significant result obtains for 'cultural convergence', an expected consequence of globalisation. Those countries- Germany is an illustrative case- with high entrepreneurship ratios in 1910 were likely to experience declines in 'entrepreneurial spirit' by 2000, while those with low ratios – such as Italy – probably exhibited a rise in entrepreneurial spirit. This is not convergence in the sense of catching up, but over-taking, for as Figure 1 shows, on average countries with ratios above 6 percent in 1910 have lower ratios in 2000, and conversely. The very large absolute value of the negative coefficient of the convergence equation implies that the ranking of entrepreneurial cultures will be reversed over the century. Either this is because of the impermanence of cultures, or, the interpretation preferred here, because of the limited nature of the ratio measure.

The origin groups that decline can be classified broadly as the western European core, and those that increase, the European periphery (Table 3). The rest of the world contributes the stable group. If new immigrant groups in 1910 were more prone to entrepreneurship, then we should see convergence over the twentieth century with entrepreneur ratios falling (dependent variables less than unity in Figure 1) for the high ratio groups in 1910 and no significant change among established migrant groups (dependent variable = 1) or perhaps a slight rise. In fact around half the sample increased their entrepreneurial ratios over the twentieth century. They include the largest migrant group in 1850, the Irish, as well as 'new migrants' such as those from Greece and Italy who only began arriving in the decades immediately before the First World War. A possible reason for these changes is the inadequacy of the simple ratio as a measure of entrepreneurial culture. All three groups may have become more entrepreneurial

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[8] According to t-tests.

as they accumulated wealth and education, without any change in underlying culture.

Entrepreneurial Controls

The alternative measure of culture supposes that education, wealth and other variables that determine entrepreneurial behaviour, in practice are more influenced by institutions and chance than by culture. If so, a more accurate measure of entrepreneurial culture can be obtained by controlling for these and other variables. On the second interpretation of culture, Figure 1 does not show genuine cultural convergence but the impact of convergence of non-cultural influences upon entrepreneurial behaviour.

We therefore first describe the results for the controls estimated from logit equations (Table 4). Property ownership in 1910 raised the chances of being an employer by 1.6 percentage points, by the same percentage as naturalisation and residence in the US for more than 10 years (there is not much evidence of increasing effects beyond a decade). Age increased the chances of becoming an employer up to 58 years old. The rise in probability between the ages of 30 and 60 was about 1.5 percentage points. Being male in 1910 added 1.1 percent to the likelihood of entrepreneurship, while literacy and the ability to speak English contributed 1.1 and 1.4 percentage points respectively.

These are contributors to the supply of entrepreneurs. On the demand side or entrepreneurial opportunities, in 1910 unsurprisingly the sector with the lowest entry barrier for entrepreneurship was the wholesale and retail trade (relative to the base case of mining). Finance, real estate and personal and professional services came second in raising the chances of entrepreneurship. Construction was the third easiest sector for new entry. Manufacturing was little better than mining, and transport, communication and other utilities was not significantly different from the base case.

Ninety years later the marginal effects of the entrepreneurial supply variables were rather smaller in general in 2000 than in 1910. In part this is because the general propensity for entrepreneurship had fallen and perhaps also because of the greater abundance of human capital. Table 4 shows that being male increased entrepreneurial chances by 1.3 percent in 2000, unusually rather more than in

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1910. The impact of marriage on the probability of entrepreneurship more than halved in 2000 relative to 1910..

Age at which probability of entrepreneurship was maximised rose to almost 63, perhaps reflecting greater life expectation. Length of residence in the US for maximum probability of entrepreneurship increased to 16-20 years in 2000. Property ownership raised the likelihood by 1.1 percentage points in the later year, compared with 1.6 percentage points 90 years earlier, possibly because credit arrangements became easier. Education variables at the later date replace 'literacy' in 2000 and so are not directly comparable, but college education increased entrepreneurial chances. Changes in technology enhanced the attractiveness of the transport, communication and other utilities sector for start-up businesses. Organisational changes may well have been responsible for the opposite effect in Personal, Recreational and Professional Services.

Controlled Entrepreneurial Culture Effects

From the same logit equations above, we take the country of origin coefficients of Table 5. At the 5 percent probability we cannot reject a zero 'controlled' culture effect for the heterogeneous group of Portugal, Netherlands, Scotland, France, Germany, Austria, Mexico, and Cuba in 1910 according to the LR test (not shown) (Table 5). In the 'above average' entrepreneurship groups, we note that China was subject to restrictions which would enhance entrepreneurship in the US, and that the Russia-originating migrants were predominantly Jews. This leaves persons originating from Greece, Spain, Turkey and Italy in that order as disproportionately entrepreneurial, other things being equal, in 1910 (excluding Cuba because the coefficient is not significantly different from zero). At the other end of the scale Ireland provided disproportionately the most unentrepreneurial types, controlling for other influences, followed by Sweden and then England. All three were below the group average.

In 2000 Jews (persons from Israel), migrants from Greece and Turkey, and Italy are among the most entrepreneurial, consistent with some cultural persistence[9](Table 5). Cuba joins the entrepreneurial group as does (a smaller) Austria. England remains significantly unentrepreneurial, joined by Japan,

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[9] Syria and Lebanon-originating persons were also disproportionately entrepreneurial. They were in 1910 as well, but the sample available then was too small to command confidence.

Germany, Scotland, Portugal and Mexico[10]. Ireland has left the unentrepreneurial category - judging by an LR test, and China has not quite entered it, on the same criterion. For seven origins (France, Ireland, Netherlands, Russia, China, Sweden and Spain) the hypothesis of no distinctive cultural effect cannot be rejected. In short some countries, both entrepreneurial and unentrepeneurial, show cultural persistence over the twentieth century, others experienced cultural change.

Figure 2 plots these logit culture coefficients, to show that controlled entrepreneurial cultural convergence is more apparent than with the unadjusted measure. The standard error of the 1910 effect is 0.06 so the coefficient is significantly less than one, and there is some cultural persistence over the century. Even when the Greek origin outlier in 1910 is removed, the explained variation of the convergence equation is still 78 percent and the coefficient 0.81. Negative cultural coefficients in 1910 are associated with a rise over the twentieth century and positive coefficients are linked with a fall.

Persistence was sufficiently strong that origins revealing a 'decline in entrepreneurial spirit' were nonetheless often among the most entrepreneurial at both dates – Greece, Turkey and Italy are cases in point (Table 6). Conversely some of those with a 'rise in entrepreneurial spirit' are among the least entrepreneurial at both dates – England for instance.

To summarise, migrants from Greece, Turkey and Italy, along with Jews (if the identification for 1910 is accepted) exhibit strong and deeply embedded entrepreneurial traits. But in some obvious cases also – Ireland for instance – the culture has changed. From the pattern of country entrepreneurship it is impossible to discern any sign of a Protestant-Catholic divide that might be suggested by an interpretation of Weber's (1905) thesis. Nor does North-Western Europe, where modern economic growth originated, reveal any strong entrepreneurial cultures.

It is not possible to estimate the impact on entrepreneurial behaviour in the present sample at the same time as, on the one hand, origin country institutions or GDP/level of development, and on the other hand, culture because in the cross-section the measures are perfectly collinear[11]. But if the measures of

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[10] Compare 'One can only speculate about the reasons why so relatively few Mexican-Americans have moved into business occupations.' Grebler et al (1970 p216)

[11] Where Y is the probability of entrepreneurship, Xi are country or origin dummies and Z is the level of development of the origin countries:

entrepreneurial culture were erroneously reflecting these other influences they should be correlated which with one exception, they are not.

In fact push factors, insofar as they are measured by the institutional variables, rule of law for the 2000 sample and joint stock companies per head for 1910, were nowhere near statistically significant. Nor was origin country GDP per capita a significantly predictor of entrepreneurial culture coefficients for 2000. But at the 5 percent level GDP is significant for the 1910 coefficients (Table 7)[12]. The 1910 experience most probably reflects the pattern of 'new' immigration from poorer countries and perhaps market discrimination, because the log of migrant numbers 60 years earlier was an even more significant negative predictor, with a t ratio of about 3. That is, 'pioneer' migrants from poorer countries were more likely to be entrepreneurial in 1910 once their other characteristics such as age, experience and linguistic skills are controlled. But this relation does not persist in the year 2000 in the present sample when the migrants are no longer 'pioneers'.

New immigrant groups; those from Greece, Turkey and Japan especially, but also elsewhere in Southern and Eastern Europe – may therefore have upward biased entrepreneurial coefficients in 1910 but not in 2000. A quantitative test of persistence may need to correct downwards some coefficients (those of the new immigrant groups) in 1910 before comparing them with 2000 coefficients. On the other hand the old immigrant countries coefficients should be more satisfactory for the cross-twentieth century comparison.

Most cultures that appeared highly entrepreneurial in the first year remain so in the second year – Greeks, Jews, Italians and those from Turkey - when migrant stock effects must have worn off. Most of their entrepreneurial propensities in 1910 cannot be attributed to the circumstances of the groups, because these groups remained highly entrepreneurial long after any effect of being new to the United States must have disappeared. Conversely much of Northwestern Europe stays relatively unentrepreneurial in the second year, as it was in the first.

$$Y = a_0 + a_1 X_1 + a_2 X_2 + a_3 X_3 + a_4 X_4 + bZ + e \quad ….(1)$$

Z is defined as

$$Z = c_1 X_1 + c_2 X_2 + c_3 X_3 + c_4 X_4 \quad ….(2)$$

where c_i are the relative level of development of each country. Therefore Z is a linear combination of the country dummies explaining Y and will be perfectly collinear with them.

[12] China is excluded from the 1910 sample in the estimates of Table 7 because of the filter of legislation on Chinese migration.

Therefore it is reasonable to conclude that, despite possible pioneer migrant group effects in the first sample year, these qualitative results are unaffected.

Gender and Entrepreneurial Culture

One of the biggest cultural changes over the twentieth century was in the position of women and especially, female participation in the formal workforce. Somewhat less than 20 percent of the 1910 workforce sample was female whereas by 2000 the proportion had more than doubled. In the first year only two female 'culture' coefficients were significantly different from zero (at the 5 percent level); Irish women were significantly more entrepreneurial than Irish men, while the opposite was the case for the Scots. In the later year nine coefficients were significant.

Females from more entrepreneurial cultures were less entrepreneurial than males but those from less than averagely entrepreneurial source countries were more so (Table 8 and Figure 3). Greek-originating females in 2000 were significantly more entrepreneurial than the sample average but significantly less entrepreneurial than their male counterparts. By contrast German-originating females were more entrepreneurial than males but also less entrepreneurial than the sample average. On the one hand females confirmed the importance of inherited entrepreneurial culture in the later twentieth century when the opportunity arose, but on the other, their behaviour differed from their male counterparts.

Conclusion

The analysis has employed two alternative measures of entrepreneurial culture, uncontrolled and controlled entrepreneurship chances. The simple uncontrolled or ratio measure has the merit of simplicity but does not take into account the role of institutions and accident in creating the possibilities for entrepreneurship. Migrants from some origin countries were more likely than others to be literate or English-speaking at the beginning of the twentieth century. Such individuals might be relatively highly entrepreneurial because of these attributes acquired by historical accident, whereas purely for cultural reasons they may be less entrepreneurial than those who were illiterate. The rise of Italian and Greek ratios over the twentieth century could be explained in the converse of these terms.

The second, controlled, measure is the chance of becoming an employer, holding constant a range of other influences on the outcome. This variable assumes that for instance wealth and literacy are independent of culture as far as occupational choice is concerned. Greater persistence of this measure over the twentieth century indicates that it captures a more useful trait than the ratio indicator of entrepreneurial culture

Entrepreneurial cultures made a difference; migrants from some origins were significantly more entrepreneurial than others and most of these differences cannot be attributed to anything other than culture. Some entrepreneurial cultures also clearly persisted over the twentieth century, although for many origins they also changed substantially.

The strongest entrepreneurial cultures were exhibited by those originating from the Middle East, Greece and Turkey, though some additional historical material is necessary to establish who these people were. Consistent with a version of the 'cultural critique', the English were persistently prone to less entrepreneurship than most other US immigrant groups, once controls for other entrepreneurship influences are included. With the sample available it is impossible to distinguish definitively whether English twentieth century culture was a result of a shift in the later nineteenth century (as Wiener (1981) contended) or was comparable with that of the nineteenth century and earlier. However persistence over the turbulent twentieth century might be taken plausibly to imply durability over the less traumatic long nineteenth century as well. Which alternative is appropriate has a bearing on how much entrepreneurial cultures matter for economic development. If the 'First Industrial Nation' rose to economic prominence with a rather unentrepreneurial culture, entrepreneurial cultures may be dispensable.

That the Dutch, whose seventeenth century economic pre-eminence was no less remarkable than the later British performance, were consistently only about averagely entrepreneurial, is also compatible with the dispensability of entrepreneurial cultures. No less superfluous is the doctrine that the (predominant in the Netherlands) Protestant religion encouraged entrepreneurship. Conversely, the idea that 'Catholic culture' was inimical to economic development is not born out in the twentieth century by the sustained entrepreneurship of Cubans and Italians in the United States.

As female participation on the market labour force increased over the twentieth century, female entrepreneurship propensities were eventually moulded by these cultures. But female propensities also differed systematically from male traits acquired from the same countries of origin.

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Fig1 Entrepreneurial Cultural Convergence 1910-2000

Entrepreneurial Cultural Convergence 1910-2000

$y = -14.735x + 1.9093$
$R^2 = 0.3195$

(Chart showing "Increase in Entrepreneurship Ratio" on the y-axis from 0 to 3, and "Entrepreneurship Ratio 1910" on the x-axis from 0 to 0.1. Data points labeled: Austria, Italy, Portugal, Greece, Wales, Ireland, Japan, Turkey, Sweden, Cuba, Mexico, France, Netherland, England, Scotland, Spain, Germany.)

Fig2 'Controlled' Entrepreneurial Cultural Convergence 1910-2000

'Controlled' Entrepreneurial Cultural Convergence 1910-2000

$y = -0.8173x - 0.0005$
$R^2 = 0.9146$

X-axis: Cultural Coefficient 1910
Y-axis: Change in Culture Coefficient 1910-2000

Data points: Ireland, Sweden, Netherlands, France, Austria, Portugal, England, Jew, Scotland, Germany, Italy, Mexico, Japan, Cuba, Turkey, Spain, Greece

Fig3 Entrepreneurial Propensities by Origin Country 2000

Entrepreneurial Propensities by Origin Country 2000

$y = 1.8254x + 0.0016$
$R^2 = 0.6256$

Table 1: Ranked Entrepreneur Ratios

Country of Origin	1910	Country of Origin	2000
China	11.57%	Greece	12.02%
Germany	9.24%	Israel	10.72%
Spain	8.18%	Syria and Lebanon	9.45%
Greece	7.89%	Italy	7.82%
Netherlands	6.75%	Austria	7.11%
Russian Empire and Poland	6.14%	Turkey	6.27%
Cuba	6.02%	Cuba	5.75%
England	5.80%	Netherlands	5.34%
Scotland	5.65%	Sweden	5.14%
France	5.62%	Ireland	5.11%
Turkey	5.62%	France	4.84%
Total	5.54%	China	4.77%
Sweden	4.97%	Spain	4.37%
Ireland	3.97%	Russia	4.33%
Italy	3.60%	England	4.04%
Japan	2.99%	Germany	3.73%
Austria	2.76%	Portugal	3.56%
Portugal	2.09%	Japan	3.49%
Mexico	1.73%	Scotland	3.32%
Syria and Lebanon	NA	Total	3.31%
Israel	NA	Mexico	1.61%

Source: Calculated from IPUMSusa.

Table 2: A Level Playing Field? Entrepreneurship Ratio Regressions

Dep. Var.	ln(GDP per cap), origin	Rule of Law	JS Cos	ln(Migrants 60 years earlier)	R^2	
1910	0.011 (0.011).				0.06	N =17 Ex China
2000	-0.002 (0.009)				0.003	N=20 Inc China and Russia
1910			0.70 (1.90)		0.015	N=11
2000		-0.004 (0.007)			0.02	N=19
1910				0.001 (0.002)	0.03	N=16
2000				-0.005 (0.004)	0.09	N=20

Sources: GDP Maddison (2006). To obtain the GDP per capita for England and Scotland in 1910, Maddison data in 1913 for aggregate GDP level for the UK is used, together with the Frank Geary and Tom Stark (2002) result to calculate the proportion of GDP produced by England and Scotland. The two figures are combined to get the aggregate GDP levels for these two countries. Finally, the Maddison population data are used to derive the GDP per capita. For Cuba in 1910, the earliest available data is 1929. Because Mexico is similar to Cuba in growth and fluctuations, we derive the data for Cuba by analogy with Mexico. GDP per capita for Mexico in 1913 and 1929 does not change much. Hence, we assume GDP per capita for Cuba in 1913 is the same as 1929, i.e. 1639. For the group of Russian Empire and Poland in 1910, we take average of the two countries to get the GDP per capita for this group.

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Rule of Law: Kaufman et al. (2008). Migrants: IPUMSusa. Note : Standard errors in parentheses

Table 3: Entrepreneurial Cultural Change 1910-2000 (Ratio)

	1910 Entrepreneurship Ratio	Change in Entrepreneurship Ratio 1910-2000	
Germany	0.0924	0.524613	
Spain	0.0818	0.53423	
Scotland	0.0565	0.587611	'Decline of the Entrepreneurial Spirit'
England	0.058	0.696552	
Netherland	0.0675	0.791111	
France	0.0562	0.86121	
Mexico	0.0173	0.930636	
Cuba	0.0602	0.95515	
Sweden	0.0497	1.034205	'Persistence of Entrepreneurial Culture'
Turkey	0.0562	1.115658	
Japan	0.0299	1.167224	
Wales	0.0343	1.279883	
Ireland	0.0397	1.287154	
Greece	0.0789	1.523447	'Rise of the Entrepreneurial Spirit'
Portugal	0.0209	1.703349	
Italy	0.036	2.172222	
Austria	0.0276	2.576087	

Table 4: Entrepreneurial Culture Controls 1910 and 2000: Logit Equations

Control Variable	1910	2000
Gender (male = 1)	0.0114***	0.0131***
Marital Status (married = 1)	0.0145***	0.00629***
6~10 years in US	0.00779**	0.00523***
11~15 years in US	0.0157***	0.00828***
16~20 years in US	0.0127***	0.00914***
21+ years in US	0.0148***	0.00575***
Naturalization	0.0160***	0.00325***
Education (Literacy)	0.0106***	NA
Education (Grade 1~12)	NA	0.000319
Education (1 to 3 years of college)	NA	0.00371***
Education (4+ years of college)	NA	0.00746***
English Speaking	0.0143***	0.00489***
Construction	0.0774***	0.0457***
Manufacturing, durables	0.0107*	-0.00640*
Manufacturing, nondurables	0.0354***	-0.00206
Transportation, Communication, and Other Utilities	0.0075	0.0102
Wholesale and Retail Trade	0.0199***	0.0286***
Finance, Insurance, Real Estate, Business and Repair Services	0.102***	0.0280***
Personal, Entertainment and Recreation Services	0.106***	0.0050
Age	0.00227***	0.00196***
Age Squared	-0.0000196***	-0.0000156***
Own Property	0.0160***	0.0108***
Pseudo-R^2	0.2542	0.1229
Log Likelihood	-9189.9232	-66997.433
Number of Observations	52890	499072

NB: * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Table 5: Ranked Entrepreneurship Logit Coefficients Origin Country Effects

Country of Origin	1910	Country of Origin	2000
Greece	0.1168800	Israel	0.025877
Spain	0.0525987	Greece	0.020418
Turkey	0.0524368	Syria and Lebanon	0.017944
China	0.0362195	Turkey	0.011009
Russian Empire and Poland	0.0244376	Austria	0.005937
Cuba	0.0202049	Italy	0.005885
Japan	0.0171956	Sweden	0.005043
Italy	0.0124276	Cuba	0.002495
Mexico	0.0046409	France	0.002106
Austria	0.0016950	Russia	0.000323
Germany	0.0007538	Spain	0.000304
France	-0.0012503	Netherlands	0.000021
Scotland	-0.0025978	Ireland	-0.00035
Netherlands	-0.0028670	China	-0.00094
England	-0.0042521	Japan	-0.00256
Sweden	-0.0066595	Germany	-0.00326
Portugal	-0.0068122	England	-0.00341
Ireland	-0.0102570	Portugal	-0.00625
Syria and Lebanon	NA	Scotland	-0.00776
Israel	NA	Mexico	-0.01565

Note: Coefficients from logit equations in Table 4.

Table 6: Entrepreneurial Cultural Change 1910-200 (Coefficients)

Country	Origin Country Effect 1910	Change in Entrepreneurial Culture Coefficients 1910-2000
Greece	0.11688	-0.09646
Spain	0.052599	-0.0523
Turkey	0.052437	-0.04143
Mexico	0.004641	-0.02029
Japan	0.017196	-0.01975
Cuba	0.020205	-0.01771
Italy	0.012428	-0.00654
Scotland	-0.0026	-0.00516
Germany	0.000754	-0.00401
Portugal	-0.00681	0.000566
England	-0.00425	0.000846
Jew (Russian Empire and Poland 1910; Israel 2000)	0.024438	0.001439
Netherlands	-0.00287	0.002888
France	-0.00125	0.003356
Austria	0.001695	0.004242
Ireland	-0.01026	0.009904
Sweden	-0.00666	0.011702

Table 7: A Level Playing Field? Entrepreneurial Culture Coefficients

Dep. Var.	ln(GDP per cap), origin	Rule of Law	JS Cos.	ln(Migrants 60 years earlier)	R^2	
1910	-0.03 (0.015)				0.26	N=17 Ex China
2000	-0.001 (0.003)				0.005	N=20
1910			-0.04 (0.03)		0.17	N=11 Ex China
2000		-0.0009 (0.002)			0.008	N=20
1910				-0.016 (0.005)	0.39	N=17 Ex China
2000				0.0026 (0.003)	0.03	N=19 Ex Israel
Male 1910	-0.04 (0.02)				0.26	N=17 Ex China
Male 2000	-0.001 (0.004)				0.004	N=20

Sources: see Table 2.

Table 8: Entrepreneurial Culture Gender Effects 1910 and 2000: Logit Equations

Country of Origin	1910		2000	
	Female	Male	Female	Male
Mexico	0.00253	0.00397	-0.00603***	-0.0236***
Cuba	–	0.0306	0.00185	0.00299*
England	-0.000336	-0.00519*	-0.00346**	-0.00337**
France	0.00248	-0.00289	0.00248	0.0023
Germany	0.00219	0.000414	-0.00217*	-0.00402***
Ireland	-0.00461**	-0.0111***	-0.00296	0.00133
Netherlands	-0.00133	-0.0034	0.000549	-0.000477
Italy	0.00241	0.0144***	0.00227	0.00772***
Greece	–	0.135***	0.0123***	0.0256***
Turkey	0.00644	0.0632***	-0.00178	0.0184***
Russia	0.00176	0.0299***	-0.00099	0.00125
China	–	0.0475***	0.00199	-0.00311**
Japan	0.00184	0.0207	-0.00175	-0.00281
Syria and Lebanon	NA	NA	0.00655*	0.0240***
Israel	NA	NA	0.0132***	0.0341***
Sweden	-0.0023	-0.00755***	0.00231	0.00801
Austria	-0.00317	0.00298	0.0106*	0.00363
Scotland	-0.00598***	-0.00105	-0.00705***	-0.00849***
Portugal	0.00786	-0.00992	-0.00539***	-0.00763***
Spain	–	0.0677*	0.000981	-0.000389
Pseudo-R^2	0.1914	0.2502	0.0783	0.1359
Log Likelihood	-745.71161	-8394.4815	-22479.969	-44244.964
Number of Observations	9056	43782	217050	282022

NB: * p<0.05, ** p<0.01, *** p<0.001. Controls not reported.