Essays on United States Citizenship by Naturalization

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THESIS

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This thesis is dedicated to my sons, David and Daniel.

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SUMMARY

The focus of this thesis is on the process of naturalization, i.e. becoming a citizen of the United States. In the first chapter, I examine the association between completing the highest level of education in the US and naturalization, which is novel to the US citizenship literature. The human capital theory suggests that investments in education may to some extent be country specific and would therefore warrant higher returns. Consistent with the notion of country specific human capital that I introduce, the empirical findings suggest that there is a positive association between higher education acquired in the United States and naturalization.

The second chapter considers marriage as one of the pathways to obtaining US citizenship by naturalization. Beginning in 2008, unlike the US Census, the ACS data provide information on marital history and the timing of naturalization. I examine the association between the number of marriages and naturalization, as well as the association between the citizenship status of husbands and wives and naturalization. Although marriage introduces complexity as foreign born individuals who desire to live in the US may be more likely to marry and to seek partners with a pathway to citizenship, this study makes a contribution towards an increased understanding of the citizenship process and provides new insights into the dynamics of marriage as a pathway to citizenship.

The third chapter makes two new contributions to this literature. First, I examine the timing of naturalization and find that the probability of naturalization increases fastest during the first decade after satisfying the residency requirement. Thereafter, the probability continues to rise with time but at a slower rate. Second, I improve the methodology used in previous studies of factors associated with naturalization by the date of survey, including the first two chapters of this thesis, by utilizing the new information on date of naturalization. Focusing on the role of education acquired in the US vs in the country of origin, I revisit the models of chapter 1 with a hazard analysis that provides improved estimates with a clearer interpretation.

I. DIFFERENTIAL EFFECT OF US VS. FOREIGN HIGHER EDUCATION ON NATURALIZATION

This paper builds on a model of the naturalization process in which personal characteristics, characteristics of the country of birth and of the destination region in the United States are shown to be important determinants of acquiring citizenship. While the existing literature has examined the role of education in determining naturalization, I introduce the notion of country specific human capital and suggest that higher education acquired in the United States should have a larger impact on naturalization than education acquired elsewhere. Empirically, I show that the increase in the probability of naturalization associated with completing some college or an undergraduate degree in the US is two to three percentage points. This represents a 15% increase in the impact of the level of educational attainment alone. The impact of education depends strongly on where the education was acquired, suggesting that years of education is a crude proxy for human capital in this context. By contributing to a better understanding of the mechanism through which education impacts naturalization, this paper helps further the literature on immigrant naturalization as well as the study of human capital more generally.

1. Introduction

This paper studies the impact of higher education acquired in the United States, a form of country specific human capital, on the decision to become a citizen of the United States. Naturalization among the foreign born is viewed as a form of assimilation and has the potential to impact a wide range of economic, social, and political outcomes. This includes higher earnings as shown by Akbari (2008) and DeVoretz and Pivnenko (2005). Jasso and Rosenzweig (1986) discuss the role of naturalization in family reunification; Portes and Curtis (1987) recognize naturalization as an important factor in political influence; and Aleksynska (2011) emphasizes that citizens participate significantly more in civic engagement, which is also an indicator of assimilation. The decision to naturalize is important for both the United States and for the immigrants. Correspondingly, immigration reform continues to attract attention and calls for further research. According to the 2012 Census report, among noncitizens[1] the median household income and health care insurance coverage are significantly lower and poverty rates

[1] Noncitizens include foreign born who are in the US legally, as well as undocumented immigrants. The data do not identify them separately.

are higher than among natives and naturalized citizens.[2] This finding has been persistent over several decades.

The literature on becoming a citizen of the United States is limited, most likely due to the estimation challenges presented by the lack of adequate data. The existing research considers the costs and benefits of naturalization. Costs range from monetary outlays to the implicit cost of time it takes to pursue the application for naturalization. Benefits of naturalization, among others, include a sense of security, better employability and access to federal jobs, easier travel with a US passport, and eligibility for welfare. The literature has examined the role of personal characteristics, the characteristics of the spouse, as well as the characteristics of the country of origin in the propensity to naturalize, with several conflicting results regarding specific determinants. I use the American Community Survey 2008-2010 PUMS data set (ACS), which more than quadruples the sample size of the Census samples previously used in the literature and includes additional variables of interest.

The focus of the current study is education, a key form of investment in human capital by the foreign born. While the existing literature has examined the role of education in determining naturalization, I introduce the notion of country specific human capital and suggest that higher education acquired in the United States should have a larger impact on naturalization than education acquired elsewhere. In order to identify individuals who completed their highest reported level of education in the United States, the year of arrival is compared to the typical age of degree completion. An indicator variable is created to signal those who likely completed their tertiary education in the US and this variable is then interacted with levels of educational attainment. An obstacle to identifying the impact of location of education is that those who obtain education in their home country also arrive to the United States at a later age. I address this concern by restricting the sample to only those who arrived as adults while controlling for age at arrival and by giving careful consideration to the remaining

[2] In 2011 the median household income for natives was $50,801, for naturalized citizens $51,926 and $37,894 for noncitizens. There are 14.4% of natives in poverty, 12.5% of naturalized citizens and 24.3% of noncitizens. 13.2% of natives are uninsured, 19.1% of naturalized citizens and 44.2% of noncitizens.

determinants. Furthermore, the possibility of misclassifying those who arrived at an older age and completed their degrees later in the US, would only underestimate the impact of US education on naturalization.

Completing higher education in the US affects one's peer group and possible choices of marriage partners, it implies English proficiency and it may increase one's commitment to the US. It is, however, difficult to identify the direction of causality, as utility maximizing individuals who desire to live in the US are more likely to invest in learning English and also more likely to study in the US. The wide range of outcomes that could be affected by naturalization warrants studying factors associated with naturalization.

Several policies[3] have already been implemented in an effort to increase naturalization rates in the United States and further research could provide useful information to future policy makers as the immigration debate continues. This study lends support to the analysis of determinants presented by Chiswick and Miller (2009) and extends the literature by introducing the notion of country specific human capital and examining the impact of obtaining higher education in the United States. Empirically, I show that the impact of education depends strongly on where the education was acquired, suggesting that years of education is a crude proxy for human capital in this context. The analysis provides further insight into the decision making process of immigrants regarding naturalization, i.e. becoming a citizen of the United States.

The second chapter of my thesis explores marriage as a possible pathway to citizenship. Though marriage introduces complexity, as unobservable factors such as preferences and discount rates may impact both marriage and naturalization, this study makes an additional contribution to help increase

[3] In 1992, the Green Card Replacement Program was initiated to replace the old Alien Registration Receipt Card with a new and harder to forge Permanent Resident Card. This program was expected to increase naturalization rates, as those who were eligible to become residents would pursue naturalization instead of replacing their green cards (Jones-Correa, 2001). In 1996, the PRWORA (Personal Responsibility and Work Opportunity Reconciliation Act) restricted eligibility for federal welfare benefits such as Medicaid and food stamps for most legal immigrants and basically denied these benefits during their first five years in the US. Welfare reform was also thought to encourage naturalization (Bloemraad, 2002; Jones-Correa, 2001).

understanding of the citizenship process. I carefully examine the association between the citizenship status of husbands and wives, as well as the association between the number of marriages and naturalization. Marriage is one of the pathways to obtaining US citizenship by naturalization and unlike the Census (used by Akbari, 2008; Bloemraad, 2002; Chiswick and Miller, 2009; Jones-Correa, 2001; Mazzolari, 2009; Yang, 1994) the ACS data, as of 2008, provide information on marital history and the timing of naturalization and thus consequently allow for additional analyses. For married couples in which both partners are foreign born, I am able to identify which partner obtained citizenship first and, if applicable, whether each spouse was naturalized prior to or after getting married, as the year of last marriage is also known.

In order to enhance the analysis even further, in chapter three of my thesis, I exploit the richness of the ACS data to study the timing of citizenship using a hazard analysis. The information on the timing of naturalization was not available prior to 2008 and I therefore expect to improve the methodology used in the literature to date and get more precise estimates of the role of higher education completed in the US in the citizenship decision.

This is a brief outline of this chapter. Section 2 sets up the conceptual framework by presenting the necessary requirements for obtaining US citizenship. Section 3 provides a literature overview. Section 4 outlines the estimation model. Section 5 examines the data. Results are presented in section 6, and section 7 identifies the limitations. Section 8 summarizes and concludes. Appendix A lays out the theoretical foundation of the model, and addresses the endogeneity of several variables of interest and Appendix B presents alternative model estimations for robustness check.

2. Conceptual Framework

This section outlines the legal aspects of the naturalization process in the United States, discusses a cost benefit framework for the decision to naturalize, and presents the specification model.

2.1 Becoming a Citizen of the United States: The Laws

In the United States, any person who is born in the US and territories is defined as a citizen. This is embodied in the common law and is referred to as the jus soli principle (Bertocchi and Strozzi, 2010). Additionally, citizenship by descent is referred to as the jus sanguinis principle and a child inherits citizenship from his or her parents, independent of place of birth. Another way to acquire citizenship is by naturalization. In order to be naturalized, one must be at least 18 years old, have resided in the US for at least 5 years[4] as a permanent resident (green card holder), [5] have resided within a state or district for at least three months, and must pass the citizenship exam (US Citizenship and Immigration Services, 2012). The citizenship exam is administered during an interview, where the applicant shall demonstrate basic knowledge of English and which consists of questions covering US history and government. [6] If these conditions are successfully met and there are no grounds for refusal such as criminal offenses, [7] the applicant is required to take the Oath of Allegiance, which renounces former allegiances, as the United States does not support dual citizenship. [8]

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[4] "Resided" means retained legal residence, with no single absence of more than 1 year. Absence of more than 6 months may restart the clock of counting the continuous residence. The residency requirements vary by country. For example, many European countries have much longer waiting periods (prior to 2000, immigrants in Germany had to wait for 15 years to be eligible for naturalization), see Mariani (2013).

[5] Marriage to a US citizen or permanent resident, sponsorship by a relative or an employer, refugee status, or service in the US military are some of the pathways for permanent residency. All applicants must physically be present in the United States for at least 30 months (18 months if married to a US citizen, those married to a US citizen have a shorter waiting period of 3 years) during the waiting period. They must reside in the state where they apply for at least three months. (US Citizenship and Immigration Services, 2012).

[6] Special considerations are given to the impaired and to the elderly who have resided in the US for 20 years.

[7] Certain crimes such as aggravated felony, drug related, gambling, prostitution, etc. will likely lead to disqualification.

[8] This provision is not enforced and many new Americans never give up their old passports.

2.2 How to Naturalize?

The decision to naturalize stems from previous decisions undertaken in the country of origin and after migration. The first decision for the foreign born person was to leave their home country. As any decision, there are costs and benefits associated with it. For migrants, the expected benefits must have outweighed the costs. This is the first selection in the process. The literature discusses positive self-selection of immigrants – those who are skilled will migrate to capture more favorable economic opportunities in the destination country, sometimes referred to as 'brain drain'. There is also a possibility of negative selection of immigrants – those who have no bright outlooks in their home country might migrate to improve their living standards in the destination, though at low level jobs.

Assuming their entry was legal and they are eligible to acquire permanent residency status, once in the new country, upon meeting the requirements for naturalization, the immigrants have a choice of whether to remain permanent residents or become citizens, a second selection in the process.[9] A few examples of legal entry include a future employer expressing interest and providing sponsorships for someone currently living abroad or for a foreign student or temporary worker already in the US, a family member might sponsor a foreign born relative, a US citizen could apply for a fiancée visa for the future spouse prior to entry, there is also a "green card lottery" in which the foreign born may participate and win the possibility of becoming a permanent resident, and they might also be granted a refugee status. These types of visas are known as immigrant visas, as they allow a pathway to permanent residency, and ultimately naturalization.

For individuals who entered the US illegally, or entered legally but allowed their temporary, non-immigrant visa (such as student or visitor) to expire, the option to naturalize is not readily available as they failed to maintain their legal status and to acquire permanent residency. There are, however, ways a person could become documented. The United States occasionally issues an amnesty or implements a

[9] DeVoretz (2008) identifies three selections. First the decision to migrate, second the selection by the host country whether to grant status (Canada has a point system evaluating skills), and third the decision to naturalize.

program targeting specific groups of undocumented immigrants, though the chance to legalize is likely to be accompanied by large fines and lengthy legal procedures. [10] For a foreign born individual without a permanent residency, another way to obtain a legal status is via marriage to a US citizen, a pathway which is considered in this thesis.

The ACS data do not indicate which noncitizens have permanent residency status, which are on temporary visas and which may be in the US illegally. [11] The lack of visa information in data such as the Census is considered to be a major flaw for the study of naturalization by Jasso and Rosenzweig (1986). However, as is reviewed in the Literature section, other studies have undertaken analyses of naturalization using Census type data, similar in nature to the ACS, in several different countries. Moreover, the model is tested on a sample excluding immigrants from Mexico, the majority of undocumented immigrants in the US, to minimize the potential bias of including undocumented individuals who are ineligible for naturalization.

2.3 Why Naturalize? Costs and Benefits of Naturalization

For immigrants, becoming a US citizen is not only significant for national pride and allegiance, it also opens a new set of opportunities that may have an impact on economic, social and political outcomes. Once naturalized, the person has a certain sense of security and protection. S/he no longer has to fear that s/he may be forced to return to the country of origin (deported) and is able to travel with a US passport which generally makes traveling much easier due to fewer visa requirements.

[10] For example, the Legal Immigration Family Equity Act ("LIFE Act") which ended in 2001 permitted adjustment of status to people who would otherwise not be eligible, provided they paid a $1,000 fine and complied with the legal procedure (US Department of Justice).

[11] The U.S. Department of Homeland Security (2011) estimates the total number of unauthorized immigrants to be 11.5 million, about 1/3 of the foreign born in the US. Around 70% of the illegal immigrants arrived to the United States after 1995 and 60% are between the ages of 25 and 44. Most unauthorized immigrants come from Mexico (more than 10x compared to the other countries), with California and Texas being the top receiving states.

Naturalized citizens can become sponsors of their own relatives and aid in their immigration.[12] Akbari (2008) also suggests that post 9/11 the foreign born may have been prompted to naturalize to avoid unpleasant integration experiences, though no evidence exists. Moreover, as citizens they can also vote and run for public office;[13] they can thus participate and be actively involved in their communities. Several jobs are also available to citizens only, such as working for the post office or for private companies that receive military or defense contracts. Fougere and Safi (2008) use panel data from France and find that naturalization has a high and positive effect on employability. DeVoretz and Pivnenko (2004) conduct a cost benefit analysis of citizenship in Canada and show that earnings increase upon naturalization. Akbari (2008) hypothesizes that citizenship signals to employers "greater knowledge of local customs and traditions that is essential for a firm's success." Borjas (2002) suggests that eligibility for welfare is a strong motivator for the foreign born to naturalize.

While there are numerous benefits associated with becoming a US citizen, there are also costs. Explicit financial outlays include fees for the application to the US Citizenship and Immigration Services[14] and in many cases also for an attorney. There are additional new responsibilities which may increase the perceived cost of citizenship. Implicit costs may include having to give up the original citizenship, as many countries do not allow dual citizenship for naturalized citizens, and serving in the military if necessary. However, serving in the US military, just as being married to a US citizen, also likely reduces the cost of naturalization due to the shorter waiting period and waived application fee for

[12] Permanent residents are limited to sponsoring their immediate family: spouse and unmarried children. Citizens can also sponsor their parents, siblings and married adult children.

[13] Naturalized citizens cannot run for president and vice president of the United States.

[14] The fee is $595, plus a biometric fee of $85 for a total of $680. Military applicants are exempt from the fee. Applicants 75 years or older are not charged the biometric fee (US Citizenship and Immigration Services, 2012).

military applicants. Other examples of opportunity costs include the time the application process takes[15] and the time studying for the citizenship exam.

It is difficult to estimate the full cost-benefit analysis, as most data sets do not provide information on all the possible factors, such as visa category, citizenship status of parents, or the mode of obtaining citizenship (refugee, marriage, family or work sponsorship, military, etc.). Reduced form estimates are used in the current study. The analysis is focused on how the country specific component of education impacts naturalization. Acquiring education in the United States may affect both the costs and the benefits of naturalization. Studying in the United States implies English fluency, which would reduce the cost of naturalization. If US specific human capital is indeed more applicable in the US labor market, the human capital stock of individuals who completed their highest level of education in the US would likely be valued more highly by potential employers. This may be expressed by sponsorship offers, providing a pathway to citizenship. The US specific human capital may warrant higher compensation which would provide an incentive to naturalize in order to be eligible to apply for more jobs. Furthermore, completing higher education in the US not only provides one with an employment network, it also implies that the potential marriage market for those foreign born will be different, as many relationships and networking connections are initiated in college. The accumulated social capital provides a further incentive to naturalize. Completing the highest level of education in the US is expected to result in higher likelihood of naturalization.

It is, however, difficult to identify the causal effect of studying in the US on the probability of naturalization. The analysis is focused on the foreign born who arrived as adults and pursuing education in the US is a choice that may have been made with the goal of eventually staying in the US. Individuals who desire to live in the US may be more likely to study English and thus also more likely to purse higher education in the United States. Furthermore, individuals who are future oriented may be

[15] In Bertocchi and Strozzi (2010) who study the evolution of the legal institution of citizenship, 44 percent of countries require 5 years of residence for naturalization, which can be considered a relatively open attitude, whereas 46 percent require more time, and only 10 percent are more open.

more likely to obtain higher education and more likely to naturalize. The discount rate is not observed, along with other possibly omitted personal factors such as preferences. Therefore, the identification is challenging, as the estimated coefficients on US education may capture unobserved factors that are correlated with US education and naturalization.

3. Literature Review

The literature on naturalization of foreign born migrants in their destination country is multidisciplinary, with most articles in sociology and economics. DeVoretz (2008) calls for joint efforts. Likely due to the estimation challenges resulting from the lack of adequate data, this area of research continues to show relatively small development and often conflicting results. Chiswick and Miller (2009) show that about 46% of the foreign born adults had naturalized by the time of the survey based on 2000 US Census data. For comparison, Fougere and Safi (2008) show that 41% of immigrants in France had naturalized, Zimmerman et al. (2009) show that only about 30% of eligible immigrants in Germany had naturalized and they mention that ascension rate in Canada is around 70%, which is supported by Bloemraad (2002) who suggests that the Canadian system is more immigrant friendly.

An overview of selected papers is presented in Table I and allows the reader to compare the inconclusive findings regarding the determinants of citizenship in the existing literature. These papers consider the costs versus the benefits of naturalization and study immigrants in the United States, Canada, Australia, France, Germany or selected European countries. Additional papers not reported in Table I are referred to within the detailed discussion of specific characteristics.

The majority of the papers use cross-sectional data and are unable to identify personal characteristics prior to the survey. With the exception of Jasso and Rosenzweig (1986), who show that having an employment visa is a strong predictor of naturalization, the studies also lack the visa status at entry. The current study is an improvement, as the year of naturalization is known, and citizenship status, though not visa type, at entry can be determined. The literature has previously identified several important factors associated with naturalization in the following general areas: personal characteristics of the foreign born; characteristics of the country of origin ranging from political to economic conditions; and characteristics of the destination country or more specifically of the particular region in the destination country.

TABLE I: SELECTED OUTCOMES FROM THE LITERATURE BY CATEGORY: PERSONAL, DESTINATION, AND ORIGIN CHARACTERISTICS.

Author (Year)	Chiswick & Miller (2009)	Jasso and Rosenzweig (1986)	Portes and Curtis (1987)	Yang (1994)	Bloemraad (2002)	DeVoretz & Pivnenko (2004)	DeVoretz & Pivnenko (2005)	DeVoretz (2008)	Evans (1988)	Fougere & Safi (2008)	Zimmermann et al. (2009)	Dronkers, Vink (2012)
Destination country	USA	USA	USA	USA	CAN	CAN	CAN	CAN	AUS	FRA	GER	EUR
Data Source	2000 US Census, 1%, & country characteristics	INS records (1971-1981),, 1970 Census 1% PUMS	Mexican immigrants, interviewed upon arrival, 3 and 6 years after	1980 US Census 5% PUMS sample , & country characteristics	1990 US Census 5% PUMS, 1991 Canadian Census 20% sample	1996 Canadian Census, 3%	1996 Canadian Census, 3%	1991, 1996, 2001 2.8% Canadian Census	1981 Australian Census, 1% public use sample	French Census 1968, 1975, 1982, 1990, 1999	2005 German Socio-economic panel	2nd & 3rd wave European Social Survey .2004-07
Sample (Age group and model specification)	25-64, separate analysis for Males and Females	21 years or older. Separate analyses for males and females.	18-60, male only	18 or older in 1980, came 1970-1974, pooled across males and females	Portuguese, 18 or older, pooled across males and females	18-65, separate analysis for Males and Females	25-64 years old, employed immigrants	15-64, pooled across male sand females	20-64 years old, pooled across males and females, by birthplace regions	18-55 , separate analysis for males and females	Household heads , pooled across males and females	15 or older, 15 countries, 1st and 2nd generation
Personal:												
Age at entry	+	-		+							-	
Age			NS		+	+	+	+		+		+
Years since migration	+				+	+		+	+			+
Education	+		NS	+	+		+	NS	NS	+	NS	NS
English			+	+	+				+			+
Other language	NS											-
Military	+			+								
Female				+	NS			-	NS	-	+	
Married	NS		NS	+	NS	-	- M		NS	+M,-F	NS	
Spouse citizen		+ M	+									
Spouse foreign	- F											
Spouse education	+											
Children	NS		+	+		+	+ M					
Lived abroad	-											
Income /employed			NS	+	NS	-M,+F	+	+	NS	+		NS
Owns a Home			+	+	+	+		+	+			
Destination:												
Central city	NS		NS	+				+				
Ethnic enclave (language)	- M		NS	-						+		
Foreign enclave										-		
Origin:												
Sojourner index	-											
GNP/GDP	-	-		-								NS
Socialist / low civil liberties	+	+		+								+
Refugee sending				+								
Dual citizenship	+			-				-			+Muslim	-
English official	+ F	NS		-								
Linguistic distance	+ F											
Distance	+	+		+								

+ positive relationship, - negative relationship, M male, F female, NS not significant

3.1 Personal Characteristics

Education is generally found to be positively associated with naturalization (Bloemraad, 2002; Chiswick and Miller, 2009; DeVoretz and Pivnenko, 2005; Fougere and Safi, 2008; Yang, 1994), though some studies do not show a significant relationship (DeVoretz, 2008; Dronkers and Vink, 2012; Evans, 1988; Portes and Curtis. 1987; Zimmerman et al, 2009). Evans (1988) who studies immigrants in Australia looks at education completed in the host country. She differentiates child and adult immigrants and attributes some of the higher likelihood of becoming a citizen of the child immigrants to being educated in the host country, as the integration process into the society and national identity might play an important role in the decision to naturalize. [16] The current study furthers the literature by carefully examining the impact of education and develops the theory considered by Evans[17] (1988) further by the use of a human capital framework.

Most studies focus on adult immigrants to reflect the choice of naturalization. If child immigrants are considered, the decision to naturalize was likely made or influenced by their parents. In the studies of adults, an older current age is positively associated with having made the transition to naturalization. The time spent in the destination country (years since migration) is found to be an important predictor in the majority of the reviewed studies, where years since migration increase the incidence of naturalization at a decreasing rate.

Naturally, the ability to speak English is also a factor (Bloemraad, 2002; Dronkers and Vink, 2012; Evans, 1988; Portes and Curtis, 1987; Yang, 1974), as it signals integration and also improves the chances of passing the citizenship exam in the US. Dronkers and Vink (2012) and Chiswick and

[16] She also included a No Religion indicator, to capture the lack of ties to the community; however the ACS does not provide such information.

[17] Chiswick (1978) applied similar methodology when studying the earnings of foreign born men and found small differences in returns to schooling pre and post immigration, on the margin of significance.

Miller[18] (2009) include an indicator for language other than English being spoken at home and show a negative association. Another positive determinant is whether the immigrant served in the US military (Chiswick and Miller, 2009; Yang, 1994), which not only signals commitment to the destination country, but also speeds up the naturalization process. Chiswick and Miller (2009) find those who lived abroad 5 years prior to the survey to be less likely to naturalize.

Several studies report females to be more likely to be naturalized (for the US: Yang, 1994; for Germany: Zimmerman et al., 2009). Yang (1994) suggests that naturalization helps women free themselves from repressive marriages or occupations, as citizenship provides autonomy. However, DeVoretz (2008) for Canada and Fougere and Safi (2008) for France report females to be less likely to naturalize, while some studies show no significant difference. Chiswick and Miller (2009), DeSipio (1987), Fougere and Safi (2008), Jasso and Rosenzweig (1986), and Zimmermann et al. (2009) estimate the models separately for males and females to allow for differences by gender.

Marriage itself is another factor for which there are conflicting results in the literature. Several studies show no significant association between current marital status and naturalization: Bloemraad (2002) in Canada, Evans (1988) in Australia, Chiswick and Miller (2009) in the US, Fougere and Safi (2008) in France, Portes and Curtis (1987) among legal Mexican immigrants in the US, Zimmermann et al. (2009) in Germany. On the other hand, some studies show a negative association: DeVoretz and Pivnenko (2004, 2005) using Canadian Census data, while Yang (1994) shows a positive association in the US. The evidence on marital status is mixed, but the evidence on being married to a US citizen suggests a positive association with naturalization[19] (Jasso and Rosenzweig, 1986; Portes and Curtis, 1987). This thesis aims to fill this gap in the literature by exploring the role of marital status and spouse's characteristics, as well as by adding consideration of marital history.

[18] The coefficient is not statistically significant in the Chiswick and Miller (2009) study.

[19] It also speeds up the application process.

3.2 Destination Country/Region Characteristics

Yang (1994) includes characteristics of the host country in his estimation. For example, living in an urban area may make the application process more accessible for immigrants, as it may provide support mechanisms via outreach organizations, etc. He uses urban concentration from 1980 Census PUMS and shows a positive relationship, confirmed by DeVoretz (2008) in Canada. Chiswick and Miller (2009) and Portes and Curtis (1987) also include metropolitan area in their specification but do not find the relationship significant.

The role of ethnic enclaves is also explored in the literature. Yang (1994) mentions that on the one hand, the proximity of people from the same country of origin could decrease the need to naturalize, as the immigrants can find what they need within the community. On the other hand, the enclave could facilitate the process of naturalization, make information readily available, provide support groups, etc. Empirically, he finds a negative association, but his measure of ethnic enclave is not location specific. Chiswick and Miller (2009) improve the specification of ethnic enclaves by including the minority language concentration in the area of current residence (PUMA[20]), thus adding the location component, and also find a negative association.[21] Portes and Curtis (1987) suggest that the ethnicity of the neighborhood (living in an Anglo neighborhood) might impact immigrants' decisions. Fougere and Safi (2008) consider the percentage of all foreign born in the area and find a negative association between the size of the foreign enclave and naturalization. They attribute the result to the possibility of a longer waiting line for the administrative process of naturalization.

[20] PUMA is the most detailed geographical location in the ACS (at least 100,000 people). Each state is divided into PUMAs.

[21] Significant only for males.

3.3 Country of Origin Characteristics

A measure of return migration is not readily available in cross-sectional data sets. Chiswick and Miller (2009) construct a sojourner index, defined as the percentage of immigrants from the same country of origin who have lived abroad 5 years prior to the Census. This measure is designed to capture the propensity to return migration but does not vary across time, as pointed out by the authors.

The economic and political conditions in the country of origin are also important factors of naturalization. The less favorable the conditions in the country of origin, the more one would like to ensure their ability to stay in the host country. GDP per capita is a measure of average income and is used to capture possible economic opportunities in the country of origin. Chiswick and Miller (2009), Jasso and Rosenzweig (1986), and Yang (1994) show the expected negative relationship between GDP in the country of origin and naturalization in the US. Dronkers and Vink's (2012) results on GDP are not conclusive for immigrants in Europe, possibly due to the integration of the European Union. As far as political conditions in the country of origin, Jasso and Rosenzweig (1986) include an indicator for a socialist country and Yang (1994) adds a control for a refugee sending country, Dronkers and Vink (2012) measure political stability of the sending country, and Chiswick and Miller's model (2009) controls for civil liberties and political rights. The studies conclude less favorable conditions to be indicative of higher propensity to naturalize.

Yang (1994) also estimates the impact of the country of origin's recognition of dual citizenship on naturalization, i.e., whether the person is allowed to remain a citizen of the country of origin and also become a citizen of the host country. He argues that if one does not have to give up the original citizenship, this may decrease the perceived costs of naturalization, though he empirically finds a negative relationship (also found among immigrants within the European Union by Dronkers and Vink (2012) and by Akbari (2008) for the US). Yang hypothesizes that the additional responsibilities of dual citizenship may outweigh the additional benefits, Akbari attributes it to confusion in understanding the

laws. Bloemraad (2002) suggests that recognizing dual citizenship is more important for the home country, not as much for the host country. For the US, Chiswick and Miller (2009), Jones-Correa's (2000), and Mazzolari[22] (2009) show that individuals from countries recognizing dual citizenship have higher rates of naturalization in the US, relative to individuals from countries that do not, [23] and Zimmerman et al. (2009) show that dual citizenship increases naturalization rates among Muslim immigrants in Germany. [24] In support of the positive relationship between dual citizenship and naturalization, Bloemraad (2004) shows that among immigrants in Canada, the percentage of naturalized citizens in Canada who claim dual citizenship has risen. [25]

Jasso and Rosenzweig (1986) speculate that immigrants from countries with English as an official language might have a higher propensity to naturalize, as knowledge of English is critical in passing the citizenship exam. However, Yang (1994) finds a negative association in the US, Evans (1988) shows that Anglophone immigrants in Australia have the lowest odds of becoming a citizen, and Chiswick and Miller (2009) do not find statistically significant relationship for males, though positive for females. The current study aims to explore this issue further.

Chiswick and Miller (2005) improve the empirical estimations of language in the immigration literature by developing a linguistic distance variable which measures the relative closeness of the native language to English and is thus a proxy for the difficulty of learning English. However, in their 2009

[22] Mazzolari (2009) studies US immigrants from Latin America and also shows an increase in employment and earnings.

[23] Jones-Correa (2000) considers the cost-benefit analysis of dual nationality from not only the immigrant's perspective but also from the perspective of the sending and receiving countries. For sending country the pros include promoting economic development, encouraging remittances and developing sympathetic lobby in receiving country; the cons include permitting undue influence of immigrants in domestic politics. For the receiving country the pros include support for foreign policy goals, encouraging naturalization of immigrants, recognizing allegiances; the cons are divided loyalties of citizens and devaluing the meaning of citizenship.

[24] Zimmerman et al. (2009) show different levels of naturalization rates for Turkish immigrants in Germany by religion and speculate that the necessity to renounce the formal ties with the Muslim country might be too large of a cost for the Muslim group, resulting in lower rates of naturalization.

[25] She uses 1981, 1991 and 1996 Canadian Census (20% sample) and the shares of those who claim dual citizenship were 6.1%, 11.2% and 17.8% respectively, though this cannot be measured using the ACS data for the US.

study of determinants of citizenship, this variable is surprisingly found to be positively associated with naturalization for females and insignificant for males and is robust to several specifications checks.

The geographic distance between the destination country and the country of origin is also cited in the literature as a determining factor in the decision to naturalize (Table I). The further away the country of origin is from the host country, the larger the moving costs are to return. Chiswick and Miller (2009) conclude that individual characteristics are more important than the macro features of the country of origin for immigrants in the United States. This is confirmed by Dronkers and Vink (2012), who further imply that the characteristics of the destination country are more important than the characteristics of the country of origin.

Bloemraad (2002) points out that there might be some common factors among immigrants from the same country that could affect naturalization decisions, and therefore place of birth should be controlled for. DeVoretz and Pivnenko (2004) look at the desire for family reunification. As Chinese and Indian immigrants show a greater propensity to sponsor family members, return migration by that group would be less likely, adding a compelling reason to control for country of origin. Evans (1988) shows distinctively different patterns in naturalization among immigrants from different regions of origin in Australia. Similar results are found for the United States by DeSipio (1987), by Zimmermann et al. (2009) who show country of origin as an important determinant of naturalization in Germany, and by Fougere and Safi (2008) in France. In light of these findings, the specification of the empirical model in the current study controls for place of birth.

Upon reviewing the literature, there are conflicting results regarding several characteristics, such as the roles of ethnic enclaves and marital status, which warrant additional research. The current study aims to fill the gaps and provide clarification. Furthermore, I add to the existing research, as the notion of country specific human capital has not been previously applied in the naturalization literature, and I

use the foreign enclave measure to capture the diversity of the US region. The following section describes the estimation model.

4. Estimation Model

The main goal of this paper is identifying the role of country specific human capital acquired when completing higher education in the US in the naturalization decision of the foreign born. The direction of causality cannot be determined. Acquiring US education will likely impact the probability of naturalization, as discussed earlier, but it is also possible that individuals who desire to live in the US, and thus naturalize, will be more likely to invest in learning English and to study in the US. The estimated coefficients on US education also capture unobserved factors that are correlated with US education and naturalization, such as preferences and forward looking behavior. The results must thus be interpreted as providing estimates of associations as opposed to causal effects. Based on previous literature, separate equations for males and females are estimated to allow for differences by gender.

The Ordinary Least Squares model is presented in Equation 1. The dependent variable is the probability of naturalization by the date of the survey and X represents a vector of observable characteristics. Binary indicators for high school, some college, undergraduate and graduate educational attainment, regardless of where they were completed, are included in the model. The higher levels of education are also interacted with a binary control for completing education in the US (US edu). Thus the interaction terms β_6, β_7, and β_8 represent the increase in the probability associated with US completion for a given level of education.

$$Y = \beta_0 + \beta_1 X + \beta_2 \text{HS} + \beta_3 \text{Some College} + \beta_4 \text{Undergraduate} + \beta_5 \text{Graduate} + \beta_6 \text{Some College} * \text{US edu} + \beta_7 \text{Undergraduate} * \text{US edu} + \beta_8 \text{Graduate} * \text{US edu} + \varepsilon \quad \text{Eq.1}$$

The basic model includes all the foreign born upon meeting the sample restrictions outlined in the Data section. In order to address the concern that the foreign born individuals in the data may be undocumented and thus not eligible for naturalization, the models are also estimated using a sample

excluding immigrants from Mexico, as they have been identified in the literature as the most likely to reside in the US illegally. In addition, fixed effect OLS models (country of origin) are also estimated and they assist in controlling for unobserved heterogeneity as some country specific characteristics may be correlated with educational choices.

In case of a dichotomous dependent variable, the preferred estimation method is Probit, though ordinary least squares model (OLS[26]) is utilized for the advantages of the fixed effect model. As robustness check, the results of the probit estimations are presented in Appendix B. For ease of interpretation, I present the Probit average marginal effects (AMEs): a one unit increase in the regressor is associated with the coefficient value increase in the dependent variable – the probability of naturalization. The average marginal effects for the Probit estimation are computed as follows:

$$\hat{AME} = \frac{1}{N}\Sigma_{i=1}^{N}\phi(\tilde{\beta}_1 + \tilde{\beta}_2 x)\tilde{\beta}_2 \qquad \text{Eq.2}$$

For the average marginal effects of binary variables the finite method is used:

$$\hat{AME} = \frac{1}{N}\Sigma_{i=1}^{N}[\Phi(\beta_0 + \beta_1 + \beta_2 x_2 + ... + \beta_k x_k) - \Phi(\beta_0 + \beta_2 x_2 + ... + \beta_k x_k] \qquad \text{Eq.3}$$

[26] The predicted values are interpreted as probabilities, yet may be negative or larger than one, the errors are not normally distributed and are heteroskedastic. In large samples though, OLS estimators are unbiased and asymptotically normal but due to the heteroskedasticity, they are inefficient and standard errors are larger, thus the specification may fail to recognize some determinants as significant. The OLS estimation in the current study uses the robust estimate of the variance-covariance matrix estimator to address the heteroskedasticity of the error terms. Probit is asymptotically efficient. In a Probit model, the errors are normally distributed and the probabilities can be computed from the standard normal cumulative distribution function (CDF). The Probit function is: $\Phi(z) = P[Z \leq z] = \int_{-\infty}^{z} \frac{1}{\sqrt{2\pi}} e^{-0.5u^2} du = \Phi(X\beta) = \int_{-\infty}^{X\beta} \frac{1}{\sqrt{2\pi}} e^{-0.5z^2} dz$

Basic model: (with predicted signs) - estimated using OLS and Probit (AME)

Pr (naturalized citizen | gender) = f (Personal: Age at arrival +, Years since migration +, Years since migration squared -, Speaks language other than English at home -, Lived Abroad 1 year prior to survey -, Military +, Lives alone +, Family household +, High School +, Some college +, Undergraduate +, Graduate +, US edu*Some college +, US edu*Undergraduate +, US edu*Graduate +,

US Region: Urban ?, South -, Ethnic enclave ?, Foreign enclave ?,

Origin: Sojourner index -, GDP -, Low civil liberties +, Low political rights +, Geographic distance +, Linguistic distance -, Dual citizenship +, English official language +)

Fixed effect model (country of origin) – estimated using OLS

Basic model without Origin controls.

The considerations of the individual determinants included in the empirical specification are presented in Table XVII, Appendix A. The following section examines the data. There are several variables included in prior research such as marital status, characteristics of the spouse, presence of children, [27] income, employed status or home ownership, that due to measurement error concerns or endogeneity concerns are not utilized in the current study.

[27] The ACS only captures how many children under the age of 18 live in the same household at the time of survey. This could underestimate the true number of children for older mothers, as well as in the limiting case make it appear that those who are observed at older ages do not have any children. If naturalized citizens are older, they would be more likely to be misclassified and the error would not be orthogonal to the dependent variable, thus biasing the results. The presence of children would ideally be included in the model, as it likely impacts the decision to naturalize.

5. Data

The current study uses the American Community Survey 2008-2010 PUMS. The data provide information on basic demographic and socioeconomic variables and include over 9 million observations. In the ACS, as was true for the Census, the legal status and visa type are unknown and as the data are cross-sectional, immigrants who have left the country or who may intend to leave the country in the future cannot be identified. However, as of 2008, the ACS reports the year of naturalization, the year of last marriage, as well as marital history (the number of times married) and is therefore an improvement over the Census data used in previous studies. [28]

5.1 Sample Restrictions

The sample used in the analysis is restricted to only include respondents who were born outside of the United States to parents who were not US citizens, arrived as adults[29] (18 or older), were not naturalized prior to arrival to the US, are between the ages of 25 and 64 at the time of the survey, and have lived in the US for at least 5 years, or 3 years for those married to US citizens and those who served in the US military. This restriction, resulting in 446,096 observations, should ensure that the sample includes mostly the immigrants with a choice to naturalize, assuming they are eligible. As a robustness check, the sample is further restricted to non-Mexican foreign born (324,693 observations) to address the concern that the sample likely contains immigrants who are undocumented, and thus ineligible to naturalize.

[28] Jasso and Rosenzweig (1986) use INS data and have information on visa status. Most of the remaining literature uses publicly available data such as the Census.

[29] Those who arrive as children might have a claim to citizenship based on their parents' status, and naturalization would therefore not represent their own choice as they would follow a different path to citizenship (Mazollari, 2007).

5.2 Dependent and Explanatory Variables

Table II presents the means and standard deviations for the variables utilized in the multivariate analysis along with variable definitions. The first set is for the entire sample used in the study. In order to highlight the differences in the data given the focus of this paper, US education, the second set is for respondents with at least some college education who completed it in the country of origin and the third set is for those who completed their highest educational level in the US. The variables are discussed in two sections: variables directly from or computed using the ACS, and variables merged into the data set from external sources.

TABLE II: MEANS OF SELECTED VARIABLES BY US EDUCATION

	Full sample		College in origin		College in US		Definition
	Mean	SD	Mean	SD	Mean	SD	
Education	12.21	4.59	15.72	1.87	16.06	1.93	Years of education
Less than HS	0.33	0.47	-	-	-	-	Includes GED
High school	0.18	0.38	-	-	-	-	
Some college	0.18	0.39	0.38	0.49	0.32	0.47	Includes AA & no degree
Undergraduate	0.17	0.38	0.36	0.48	0.30	0.46	
Graduate	0.14	0.35	0.26	0.44	0.38	0.49	
Completed in US	0.07	0.26	0.00	0.00	1.00	0.00	Completed highest level in the US
Personal Characteristics:							
Naturalized citizen	0.45	0.50	0.55	0.50	0.65	0.48	Citizenship status=naturalized
Male	0.47	0.50	0.46	0.50	0.50	0.50	
Age at arrival	27.79	7.91	29.62	7.23	19.40	1.32	Age at survey – yrs since migration
Years since migration	17.74	9.43	16.78	9.05	21.71	10.55	Year of survey – year of arrival
Other language	0.87	0.33	0.84	0.37	0.81	0.39	Speaks language other than English at home
Abroad	0.004	0.07	0.005	0.07	0.005	0.07	Lived outside US 1 year prior to survey
Military	0.01	0.11	0.02	0.12	0.03	0.18	Served in the US military
Family type: Family	0.90	0.30	0.89	0.32	0.86	0.35	Married couple or single parent
Lives alone	0.06	0.24	0.08	0.27	0.09	0.29	
Non-family	0.04	0.19	0.03	0.18	0.05	0.22	Non-family household
US Region Characteristics:							
Urban	0.13	0.34	0.11	0.31	0.12	0.32	PUMA 100% urban
South	0.32	0.47	0.32	0.47	0.30	0.46	Lives in the South
Ethnic enclave	6.95	11.02	3.61	7.34	3.78	7.55	% of the same origin in PUMA
Foreign enclave	28.96	17.88	27.40	17.32	27.50	16.93	% of all foreign born in PUMA
Country of Origin Characteristics:							
Sojourner Index	0.45	0.18	0.49	0.20	0.48	0.19	% from same origin who lived abroad 1year ago
GDP	8.91	7.68	9.40	9.53	8.23	8.25	GDP in thousands of US$
Civil liberties : Low	0.14	0.35	0.15	0.36	0.18	0.38	CL value of 6-7
Medium	0.61	0.49	0.57	0.50	0.57	0.49	CL value of 3-5
High	0.25	0.43	0.28	0.45	0.25	0.43	CL value of 1-2
Political rights: Low	0.17	0.38	0.19	0.39	0.21	0.41	PR value of 6-7
Medium	0.38	0.49	0.33	0.47	0.34	0.47	PR value of 3-5
High	0.45	0.50	0.48	0.50	0.45	0.50	PR value of 1-2
Geographic distance	3.73	2.76	4.80	2.64	4.84	2.76	Thousands of miles: capital to port
Linguistic distance	0.53	0.27	0.57	0.31	0.57	0.30	Range 0-1, distance from English
Dual citizenship	0.82	0.38	0.78	0.41	0.78	0.41	Origin recognizes dual citizenship
English official	0.23	0.42	0.36	0.48	0.35	0.48	English is an official language
Observations	446096		188151		31362		

Source: 2008-2010 ACS PUMS [a] Sample is restricted to the foreign born aged 25-64 at time of survey who immigrated at age 18, were not naturalized prior to arrival and who have resided in the United States for five or more years (3 years for those who served in the US military or married a US citizen).

5.3 Variables from the ACS Data

The ACS data include a citizenship status variable (US born, born in US territories, born abroad to US parents, naturalized citizen, and noncitizen) based on which a binary variable for whether one is a naturalized citizen is created and then used as the dependent variable in the estimation model. In the restricted sample, 45% of respondents had naturalized by the survey. With regard to the focus of this paper - the role of US specific human capital on naturalization - among those who completed their higher education in the US, 65% had naturalized by the survey compared to only 55% among those who completed it in their country of origin.

Years of education, 12.2 on average, are utilized to construct binary variables for levels of education: less than high school[30] (33%), high school (18%), some college (18%), undergraduate (17%) and graduate (14%). The ACS indicates the highest level of education attained but does not ask where the education was completed. To further the citizenship and human capital literature, I attempt to isolate individuals who completed their education upon arrival to the US from individuals who completed the highest level of education in the country of origin prior to arriving to the United States.

The indicator for US education is created by comparing the age by which the educational attainment would be usually completed (assuming continuous school attendance) with the age at arrival. For example, if a foreign born individual arrived to the United States at or before the age of 22 and reports having a Bachelor's Degree, the binary *US education* variable will indicate that s/he completed the degree in the United States, as it is unlikely that one could have completed an undergraduate degree prior to the age of 22. A person who has a BA and arrived after the age 22 will have a zero on the US education indicator and be therefore classified as completing education in the country of origin. The threshold age at arrival for US education is 23 for those with a Master's degree and 26 for those with doctoral degrees.

[30] Those who report having a GED are classified by this study as having less than high school education based on Cameron and Heckman (1993) who show that exam-certified high schoolers are statistically indistinguishable from the high school dropouts and perform worse than high school graduates in the labor market.

This approach will allow for the separate identification of education in the US only under the assumption that schooling was continuous. However, this study is aware that if education was not continuous, some foreign born individuals who completed college later upon arrival could be misclassified as having completed their education in the country of origin. [31] While an imperfect measure of where the attained level of education was completed, this possible measurement error would lead to underestimation of the impact of a US degree and US specific human capital on naturalization.

As seen in the first column of Table II, about 7% of the respondents completed their highest reported level of education in the United States. [32] Among them, 32% have some college, 30% have an undergraduate degree and 38% have a graduate degree (column 3). Respondents who completed their higher education in their country of origin, column 5, have a lower share of graduate degrees (26%) and higher share with lower attainments (36% undergraduate and 38% some college).

Approximately 47% of the sample is male, with a slightly higher proportion among those with US education (50%). Several variables of interest are created, as seen in Table II, using the ACS data. Age at arrival, defined as age at survey minus years since migration, is on average 27.8. The foreign born have been in the United States for slightly less than 18 years (years since migration) and 87% of them report speaking a language other than English at home. Among those with college education fewer speak another language at home: 84% among those who completed it in the country of origin and 81% among US graduates. Approximately 0.4% lived abroad one year prior to the survey and about 1% served in the military (more so among college graduates). Family categories included in the analysis include living alone (6%), living in a non-family household (4%) and living in a family: either a married couple or a single parent (90%).

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[31] For example a person, who is surveyed at age 35, arrived at age 25 and reports having a BA, will be classified by this study as completing the degree in the country of origin. However, s/he may have not held a BA at age 25 - the time of arrival, but decided to go back to college later in the United States.

[32] Since the sample is restricted to those who arrived as adults, as thus completed high school prior to arrival, the imputed country of degree completion: US education variable only pertains to those with educational attainment above high school.

Based on previous literature, which emphasizes the role of the host country characteristics, an indicator for southern regions of the US is created and about 32% of the sample resides in the South. Two measures are constructed to capture the diversity of the region. The foreign enclave variable indicates the percentage of all foreign born in the current place of residence – PUMA and is on average about 29%. Ethnic enclave measures the percentage of immigrants from the same country of origin in a PUMA and its mean value is approximately 7%. The sojourner index defined as the proportion of all surveyed immigrants from the same country of origin who lived abroad one year prior to the survey averages close to half a percent.

5.4 Variables from Other Sources

In order to enhance the analysis further, several variables are merged into the data set from external sources. Unlike the Census, the ACS does not indicate whether the respondent resides in a metropolitan area. Therefore, an alternative approach is used utilizing the Missouri Census Data Center's database (Geocorr, 2012) which provides the percentage of the population of each PUMA that lives in an urban setting. A dichotomous indicator is created to mirror the metropolitan indicator in the Census, where the PUMAs with 100% of residents living in an urban area are classified as urban. [33] Approximately 13% of the sample resides in an urban area.

Annual values of GDP per capita in the country of origin obtained from Penn World Tables (2012) are available starting in 1950 which covers the earliest possible year of arrival. [34] They are scaled to thousands of real US dollars per capita for the empirical analysis. As established by Chiswick and Miller (2009), GDP values for the fifth year after migration provide a better estimate than using the

[33] The model is also estimated using the continuous urban share variable and results remain unchanged.

[34] The minimum value for year of arrival is 1962. For countries that did not exist the entire period, the value of the previous country is used. For example, Czech Republic exists as of 1990 and for years prior to 1990 values for Czechoslovakia are used.

same value of GDP for the entire sample and average just under $9,000. Values of Civil liberties and Political rights from the Freedom House (2012) are available starting in 1973 ranging from 1 to 7; the higher the value, the worse the conditions in that country. [35] As these figures are also reported annually, the same timing approach is used as is for GDP. The average value of Civil liberties at 5 years after arrival is around 3.56 and 3.32 for Political rights. I create binary variables for Low (6-7), Medium (3-5) and High (1-2) Civil liberties and Political rights. Approximately 14% of the foreign born come from countries with low Civil liberties and 25% come from countries with high Civil liberties. Political rights are more favorable as 45% of the sample comes from countries with high values and only 17% from countries with low Political rights.

Among the time invariant characteristics is the geographic distance from the capital of the country of origin to the nearest US port in thousands of miles (Fitzpatrick, 1986[36]), which averages at 3.73 thousand miles. The linguistic distance of the native language to English ranges from 0 to 1 and native English speakers are assigned the value of 0. Those who report speaking only English at home are assigned the average of the languages primarily spoken in the country of origin. The average linguistic distance is 0.53. The country of origin recognizes dual citizenship[37] for 82% of the respondents (Renshon, 2001, updated using CUNY). English is recognized as an official language (or one of the official languages) in the country of origin[38] (Banks et al, 2008) for 23% of the respondents.

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[35] For those who arrived earlier, the 1973 values are used in the analysis. Values are missing for Bermuda, St. Kitts and Nevis, St. Lucia, St. Vincent, which are British colonies and Hong Kong, value of 1 is assigned based on Economic freedom.

[36] Google maps distance calculator was used if capital cities were not listed in Fitzpatrick (1986).

[37] Dual citizenship: Albania, Algeria, Antigua & Barbuda, Argentina, Australia, Bahamas, Bangladesh, Barbados, Belarus, Belize, Bolivia, Brazil, Bulgaria, Cambodia, Canada, Cape Verde, Chile, Colombia, Costa Rica, Croatia, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, England, Fiji, France, Germany, Ghana, Greece, Grenada, Guatemala, Guyana, Haiti, Hungary, India, Iran, Ireland, Israel, Italy, Jamaica, Jordan, Latvia, Lebanon, Lithuania, Macedonia, Mexico, Morocco, Netherlands, New Zealand, Nicaragua, Nigeria, Northern Ireland, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Romania, Russia, Scotland, South Africa, Spain, Sri Lanka, St. Kitts, St. Lucia, St. Vincent, Sudan, Sweden, Switzerland, Syria, Taiwan, Thailand, Trinidad & Tobago, Turkey, Ukraine, United Kingdom, Uruguay, Venezuela, Vietnam, and Yemen.

[38] There have been few changes in countries which recognize dual citizenship or have English as an official language.

5.5 US Education

The main contribution of this paper is the identification of the US specific human capital component of higher education. Table III presents the rates of citizenship by where the highest reported level of education was completed. Foreign born individuals who completed their education in the US have about 10 percentage points higher rate of naturalization than individuals who completed their studies prior to arrival.

TABLE III: RATE OF US CITIZENSHIP AMONG COLLEGE EDUCATED BY US EDUCATION

Educational Attainment	Rate of Citizenship		
	Schooling completed:		
	in origin	in US	Total
Graduate degree	52.38	62.32	54.32
Undergraduate degree	55.88	67.63	57.33
Some college	55.04	64.63	56.21
High school degree	-	-	42.77
Less than high school	-	-	30.78
Total	54.64	64.65	56.07

Source: 2008-2010 ACS PUMS. Sample is restricted to the foreign born aged 25-64 at time of survey who immigrated at age 18, were not naturalized prior to arrival and who have resided in the United States for five or more years (3 years for those who served in the US military or are married to a US citizen).

Based on the observable characteristics of individuals with more than high school education who could have completed their highest level of education in the US, there are some differences between the two groups, as presented in Table II. Individuals who completed their education in the US have been there longer, as they by definition arrived earlier. The impact of duration of stay at different ages is assumed to be the same. This would not be a reasonable assumption when comparing a 5 year old person to a 40 year old person, who both arrived to the United States 5 years ago. However, when comparing only adult arrivers, the assumption may not be too far of a stretch. Foreign born individuals who completed their education in the US also come from countries with lower levels of GDP and are more likely to have graduate level education.

Therefore, while Table III serves as prima facie evidence of the impact of US specific human capital on naturalization, I utilize regression analysis to control for the observable characteristics in order to explore this pattern further. In the empirical estimation, it is assumed that education was continuous and that the error term is not correlated with naturalization.

The Data section highlighted the relationships observed in the data by comparisons of means and naturalization rates among different groups within the sample. The Results section describes the findings of the multivariate regression analyses.

6. Results

The results are presented separately by gender and in sections. Both OLS and Probit equations were estimated. The OLS coefficients and Probit Average Marginal Effects in the basic model estimation are not only qualitatively similar; they are in most cases almost identical quantitatively. This is reassuring of the results, as the model is not sensitive to structural form. Therefore, for the ease of comparison of the Basic models and the Fixed Effect (country of origin) models, the OLS coefficients are reported in this section. The Probit AME results are reported in Table XVIII, Appendix B.

The results highlighting the contribution of this study, the impact of US specific human capital on naturalization, are discussed first (Table IV). Tables V and VI present the remaining controls of the estimating equation (personal characteristics, and country of origin and US region characteristics). The specifications used in the following tables are: Basic model OLS (column 1), Basic model OLS, sample excludes Mexico (column 2), FE OLS (column 3), and FE OLS, sample excludes Mexico (column 4) for males. Columns 5-8 correspond to the same sequence of models for females.

6.1 Education

Education is positively associated with naturalization as established by the existing literature, though some do not find a significant relationship (see Table I). In Table IV, columns 1 and 2 show that in the basic OLS model (column 2 excludes Mexico) compared to those with less than a high school education, male high school graduates are 10 percentage points more likely to naturalize; those who completed at least some college or undergraduate degree are 17 pp more likely. Graduate degree is associated with approximately 15 pp increase in the probability. Females with a high school diploma are over 11 pp more likely to naturalize, with some college or an undergraduate degree 20 pp more likely (not significantly different from each other). Graduate degree increases the probability of naturalization among women by 17 pp as presented in Table IV, column 5. The difference between

graduate and undergraduate impact is statistically significant and may be attributed to possibly higher opportunity cost of time for those with graduate degrees or may indicate that they may be in the US temporarily and do not intend to stay. The coefficients for both genders decrease in magnitude in the FE OLS model, suggesting that some country specific characteristics may indeed be correlated with educational choices (columns 3, 4 for males and 7, 8 for females).

TABLE IV: MODELS OF CITIZENSHIP BY GENDER – US EDUCATION

	1	2	3	4	5	6	7	8
	Male:				Female:			
	OLS	OLS w/o Mexico	FE OLS	FE OLS w/o Mexico	OLS	OLS w/o Mexico	FE OLS	FE OLS w/o Mexico
High School	0.1005***	0.0968***	0.0707***	0.0676***	0.1102***	0.0944***	0.0786***	0.0706***
	(0.0027)	(0.0037)	(0.0027)	(0.0038)	(0.0026)	(0.0034)	(0.0026)	(0.0034)
Some college	0.1737***	0.1590***	0.1354***	0.1315***	0.1940***	0.1601***	0.1538***	0.1370***
	(0.0030)	(0.0037)	(0.0031)	(0.0038)	(0.0027)	(0.0033)	(0.0028)	(0.0033)
Some college*US	**0.0242*** **	**0.0313*** **	**0.0180** **	**0.0208** **	**0.0358*** **	**0.0377*** **	**0.0265*** **	**0.0247*** **
	(0.0067)	(0.0076)	(0.0066)	(0.0075)	(0.0062)	(0.0067)	(0.0061)	(0.0066)
Undergraduate	0.1726***	0.1536***	0.1434***	0.1367***	0.2001***	0.1678***	0.1625***	0.1468***
	(0.0033)	(0.0038)	(0.0034)	(0.0039)	(0.0029)	(0.0033)	(0.0030)	(0.0035)
Undergraduate*US	**0.0451*** **	**0.0467*** **	**0.0224*** **	**0.0237*** **	**0.0424*** **	**0.0412*** **	**0.0225*** **	**0.0199** **
	(0.0066)	(0.0068)	(0.0065)	(0.0067)	(0.0061)	(0.0063)	(0.0060)	(0.0062)
Graduate	0.1537***	0.1345***	0.1292***	0.1217***	0.1760***	0.1430***	0.1312***	0.1144***
	(0.0033)	(0.0038)	(0.0035)	(0.0040)	(0.0035)	(0.0038)	(0.0036)	(0.0040)
Graduate*US	0.0013	0.0032	-0.0073	-0.0086	0.0042	0.0048	-0.0034	-0.0049
	(0.0054)	(0.0054)	(0.0053)	(0.0054)	(0.0062)	(0.0062)	(0.0060)	(0.0061)
Constant	-0.5028***	-0.5474***	-0.3569***	-0.4110***	-0.4057***	-0.3911***	-0.3016***	-0.3102***
	(0.0084)	(0.0096)	(0.0073)	(0.0091)	(0.0090)	(0.0101)	(0.0079)	(0.0093)
Observations	211096	149242	211096	149242	235000	175451	235000	175451
Adjusted R^2	0.3283	0.3050	0.3561	0.3340	0.3237	0.2808	0.3568	0.3151

Source: 2008-2010 ACS PUMS. Sample restricted to the foreign born aged 25-64 at time of survey who immigrated at age 18, were not naturalized prior to arrival and who have resided in the United States for five or more years (3 years for those who served in the US military or are married to a US citizen).

Robust standard errors in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Reference category: less than high school education. All controls specified in the estimation section are included and presented in Table V and VI.

Model is estimated with interaction terms for US education to test for significance at each level of college education. For example, the increase in the probability of naturalization for individuals who completed some college in the US is β1 SomeCollege + β2 SomeCollege*USedu. β2 represents the additional increase in probability of naturalization for individuals who completed some college in the US relative to their otherwise comparable counterparts who completed it in the country of origin.

Completing the highest reported level of education in the US increases the probability of naturalization by 2.4 pp for men and by 3.6 pp for women with some college. Completing an

undergraduate degree in the US is associated with about 4.5 pp higher likelihood for men and 4.2 pp for women. Some college and undergraduate are not statistically significantly different from each. Bachelor's and Associate's degrees, even some college certification or training program in the US have a strong impact on the probability to naturalize. The skills acquired may cover the business structure specific to the US, marketing strategies, operations management, repairs of electronics made/used in the US. The results support the hypothesis that some of the human capital investment in schooling is indeed country specific and would therefore likely increase the incentive and opportunity to naturalize. Investing in education further also signals integration into the new society.

Interestingly, among those with graduate degrees, completion in the US does not have a significantly different impact on the probability of naturalization. This finding suggests that at highly specialized levels of educational attainment the country specific component does not impact naturalization differently. Some of the foreign born who completed their education here may plan on returning to the country of origin. Also, the skills acquired in graduate school are highly specialized and may not vary in terms of attracting sponsorship from employers. For example, engineering is alike regardless of location. However, some graduate level education is not applicable in the United States. Foreign doctors or lawyers cannot easily practice in the US and we hear of physicians trained outside of the US driving taxis. Whether it is due to language barrier or the inability to pass the exams is unknown. Yet, the foreign born with graduate degrees from their country of origin have the same probability to naturalize as those who completed it in the US, ceteris paribus. Despite their inability to pursue their occupation, they may still desire to naturalize, as they likely recognize the benefits of naturalization and want to secure a better future for their children. They had given up a career in the country of origin, a large opportunity cost, and would thus want to gain stability in the US.

Another consideration should be given to the measurement error, given the assumption of continuous education. It may be more likely to be violated for the graduate level education if those who

plan to complete graduate degrees take a break and arrive here after the age of 26. They would be misclassified as completing their education in the country of origin, thus biasing the coefficient on US education downwards.

The impact of completing higher education in the US on the probability to become a citizen via naturalization ranges from 2 to 4.5 pp among those with some college or undergraduate degree. For men with undergraduate degrees the total effect is therefore is 21.11[39] pp (17.26 + 4.5) and represents a 25% increase in the probability of naturalization compared to men who likely completed their degrees prior to arriving to the US. The results are robust to the changes in specification. The results presented in columns 2, 4, 6 and 8 are estimated using the restricted sample that excludes the foreign born from Mexico. This specification addresses the concern that some of the foreign born individuals may not be eligible for naturalization and thus may potentially introduce a bias. The coefficients change minimally. The magnitude of the coefficients decreases in the fixed effect models (columns 3 and 4 for males, 7 and 8 for females), confirming the theoretical prediction that some country specific characteristics are likely correlated with educational choices. However, the impact of completing higher education in the US remains significant for those with some college or an undergraduate degree.

6.2 Personal Characteristics

The general findings of the current study lend support to relationships previously established in the literature and provide further evidence in additional areas of interest. The determinants with mixed findings in the previous literature include age at arrival, which I find to be positively associated with naturalization. In the basic model, a 10-year increase in age at arrival increases the probability of

[39] This is the OLS coefficient of US undergraduate degree when the model is estimated using a set of eight mutually exclusive and collectively exhaustive categories for educational attainment: less than HS, high school, some college in origin, some college in US, undergraduate in origin, undergraduate in US, graduate in origin, graduate in US. The results of the interacted models are presented to highlight to significant increase associated with US completion.

naturalization by 3.7 pp for men and 2.6 pp for women. [40] The relationship is weaker in the country of origin fixed effect model (2 pp and 1 pp). Those who arrive at a later age may be more serious about their migration decision and be less likely to move again compared to those who arrive at a younger age and may intend to return. Duration of stay (years since migration) is also positively associated with naturalization at a decreasing rate. In addition to the requirement of residency to gain eligibility for naturalization, the longer one lives in the destination, the more physical, human, and social capital including having children[41] s/he accumulates and would be less likely to move back to the country of origin. Each additional year is associated with over 4.5 percentage point increase in the probability to naturalize.

Speaking another language at home is negatively associated with naturalization (5 pp), supporting the results of Dronkers and Vink (2012)[42] and the theoretical prediction of stronger ties to the country of origin, but only in the basic model. Once country of origin is controlled for, the sign flips and the association is positive though of a smaller magnitude (1pp). Speaking another language at home could possibly signal higher commitment to cultural diversity and expanded learning horizon, which would signal higher ability and not hinder but encourage naturalization. Individuals who lived abroad a year prior to the survey are less likely to naturalize (3.7 pp for men, 5.9 pp for women), whereas serving in the US military, as a proxy for commitment to the host country, is positively associated with naturalization (12 pp for men, 9.5 pp for women).

[40] A squared term was included in the specification resulting in a coefficient value of virtually zero, yielding the same results and was thus omitted from the model.

[41] Due to the high likelihood of measurement error in the data, having children is not accounted for.

[42] Chiswick and Miller (2009) do not find a significant impact for females, though it is negative and on the margin of significance for males.

TABLE V: MODELS OF CITIZENSHIP BY GENDER – PERSONAL CHARACTERISTICS

	1	2	3	4	5	6	7	8
	Male:				Female:			
	OLS	OLS w/o Mexico	FE OLS	FE OLS w/o Mexico	OLS	OLS w/o Mexico	FE OLS	FE OLS w/o Mexico
Age at arrival	0.0037***	0.0032***	0.0020***	0.0021***	0.0026***	0.0017***	0.0010***	0.0005***
	(0.0001)	(0.0002)	(0.0001)	(0.0002)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Years since Migration	0.0459***	0.0570***	0.0451***	0.0562***	0.0475***	0.0574***	0.0472***	0.0573***
	(0.0004)	(0.0005)	(0.0004)	(0.0005)	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Years since migration Squared	-0.0006***	-0.0008***	-0.0005***	-0.0008***	-0.0006***	-0.0008***	-0.0006***	-0.0008***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Speaks another language at home	-0.0491***	-0.0311***	0.0116**	0.0170***	-0.0520***	-0.0381***	0.0102**	0.0143***
	(0.0037)	(0.0040)	(0.0039)	(0.0043)	(0.0035)	(0.0037)	(0.0037)	(0.0039)
Abroad	-0.0370**	-0.0324*	-0.0379**	-0.0345*	-0.0589***	-0.0593***	-0.0574***	-0.0592***
	(0.0123)	(0.0157)	(0.0121)	(0.0154)	(0.0137)	(0.0156)	(0.0135)	(0.0155)
Military	0.1195***	0.1129***	0.1088***	0.1123***	0.0949***	0.0940***	0.0828***	0.0859***
	(0.0060)	(0.0063)	(0.0061)	(0.0064)	(0.0120)	(0.0124)	(0.0119)	(0.0124)
Lives alone	0.0226***	0.0322***	0.0048	0.0127*	0.0447***	0.0481***	0.0331***	0.0335***
	(0.0052)	(0.0063)	(0.0051)	(0.0062)	(0.0063)	(0.0070)	(0.0062)	(0.0068)
Family	0.0735***	0.0909***	0.0639***	0.0786***	0.0643***	0.0762***	0.0599***	0.0652***
	(0.0038)	(0.0051)	(0.0038)	(0.0050)	(0.0052)	(0.0059)	(0.0051)	(0.0058)
Constant	-0.5028***	-0.5474***	-0.3569***	-0.4110***	-0.4057***	-0.3911***	-0.3016***	-0.3102***
	(0.0084)	(0.0096)	(0.0073)	(0.0091)	(0.0090)	(0.0101)	(0.0079)	(0.0093)
Observations	211096	149242	211096	149242	235000	175451	235000	175451
Adjusted R^2	0.3283	0.3050	0.3561	0.3340	0.3237	0.2808	0.3568	0.3151

Source: 2008-2010 ACS PUMS. Sample restricted to the foreign born aged 25-64 at time of survey who immigrated at age 18, were not naturalized prior to arrival and who have resided in the United States for five or more years (3 years for those who served in the US military or are married to a US citizen).

Robust standard errors in parentheses, $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$.

All controls specified in the estimation section are included and presented in Tables IV and VI.

The type of household also plays an important role. Compared to men living in non-family households, men living alone are over 2 pp more likely to naturalize and the association is reduced in the FE model. Interestingly, women living alone are approximately 4.5 pp more likely to naturalize – twice the magnitude of the male coefficient. The foreign born individuals living on their own and not with roommates may have better jobs and possibly sponsorship offers leading to higher rates of naturalization, or they may simply be more independent and organized and therefore more likely to pursue naturalization. The difference by gender would support the theory proposed by Yang (1994) of women potentially seeking independence and stability with naturalization. Individuals living in a family (married couple, or single headed household) are 6-7 pp more likely to naturalize. Family signals

stronger ties to the community and would therefore encourage naturalization to secure a permanent future in the United States.

6.3 US Region Characteristics

Living in an urban area is found to be negatively associated with naturalization (slightly over 2 pp), but only in the basic models, see Table VI. In the FE models, the relationship is insignificant. The existing literature finds negative results (Yang, 1974) but several studies do not find a significant relationship (Chiswick and Miller, 2009; Portes and Curtis, 1987). In a dense urban area jobs may be easier to find compared to a non-metro area, regardless of citizenship status. Outside of the city, employers may be hesitant to hire a noncitizen, especially if they are unfamiliar with the legal process or ramifications, thus providing an incentive to naturalize for foreign born individuals living in a non-urban area. Living in the South is also associated with a small decrease in the probability to naturalize of about 0.5 – 1 pp, though the relationship is insignificant for males in the FE model excluding immigrants from Mexico. The results suggest that due to the proximity to Mexico, the foreign born may be more likely to be in the US temporarily as economic migrants and not have an intention to stay permanently, or they may not be eligible. The relationship remains negative and significant for women.

TABLE VI: MODELS OF CITIZENSHIP BY GENDER – US REGION AND ORIGIN CHARACTERISTICS

	Male: 1	2	3	4	Female:5	6	7	8
	OLS	OLS w/o Mexico	FE OLS	FE OLS w/o Mexico	OLS	OLS w/o Mexico	FE OLS	FE OLS w/o Mexico
US Region:								
PUMA is urban	-0.0244***	-0.0229***	-0.0041	-0.0008	-0.0229***	-0.0208***	0.0040	0.0075*
	(0.0029)	(0.0037)	(0.0029)	(0.0037)	(0.0028)	(0.0034)	(0.0028)	(0.0034)
Lives in the South	-0.0055**	-0.0054*	-0.0040*	0.0009	-0.0125***	-0.0148***	-0.0109***	-0.0066**
	(0.0020)	(0.0025)	(0.0020)	(0.0025)	(0.0019)	(0.0023)	(0.0019)	(0.0023)
Ethnic enclave	-0.0033***	0.0008***	-0.0011***	0.0004	-0.0040***	0.0008***	-0.0013***	-0.0003
	(0.0001)	(0.0002)	(0.0001)	(0.0002)	(0.0001)	(0.0002)	(0.0001)	(0.0002)
Foreign enclave	0.0013***	0.0001	0.0003***	0.0002*	0.0014***	0.0002***	0.0002*	0.0000
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Country of origin:								
Sojourner index	-0.0979***	-0.1119***			-0.1000***	-0.1243***		
	(0.0061)	(0.0062)			(0.0058)	(0.0059)		
GDP (thousands $)	-0.0048***	-0.0033***			-0.0072***	-0.0055***		
	(0.0002)	(0.0002)			(0.0002)	(0.0002)		
Low civil liberties	0.0305***	0.0093			0.0132**	-0.0054		
	(0.0051)	(0.0051)			(0.0047)	(0.0047)		
High civil liberties	0.0128***	0.0230***			0.0072**	0.0057		
	(0.0027)	(0.0043)			(0.0027)	(0.0038)		
Low political rights	0.0686***	0.0362***			0.0936***	0.0622***		
	(0.0049)	(0.0049)			(0.0045)	(0.0045)		
High political rights	0.0016	-0.0580***			0.0078***	-0.0379***		
	(0.0025)	(0.0032)			(0.0024)	(0.0029)		
Dual citizenship	0.0496***	0.0737***			0.0369***	0.0601***		
	(0.0029)	(0.0029)			(0.0027)	(0.0027)		
English official	0.0093**	0.0026			0.0252***	0.0143***		
	(0.0031)	(0.0032)			(0.0028)	(0.0029)		
Linguistic distance	0.0688***	0.0722***			0.0775***	0.0830***		
	(0.0054)	(0.0055)			(0.0050)	(0.0051)		
Geographic distance	0.0264***	0.0232***			0.0212***	0.0173***		
	(0.0006)	(0.0006)			(0.0005)	(0.0006)		
Constant	-0.5028***	-0.5474***	-0.3569***	-0.4110***	-0.4057***	-0.3911***	-0.3016***	-0.3102***
	(0.0084)	(0.0096)	(0.0073)	(0.0091)	(0.0090)	(0.0101)	(0.0079)	(0.0093)
Observations	211096	149242	211096	149242	235000	175451	235000	175451
Adjusted R^2	0.3283	0.3050	0.3561	0.3340	0.3237	0.2808	0.3568	0.3151

Source: 2008-2010 ACS PUMS. Sample restricted to the foreign born aged 25-64 at time of survey who immigrated at age 18, were not naturalized prior to arrival and who have resided in the United States for five or more years (3 years for those who served in the US military or are married to a US citizen).

Robust standard errors in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

All controls specified in the estimation section are included and presented in Table IV and V.

As discussed in the literature section, there are two competing hypotheses regarding ethnic enclaves and I aim to provide further clarification by considering location specific measures, as well as additional types of enclaves. The current study finds a negative association between the size of the ethnic enclave and naturalization. A ten percentage point increase in the share of immigrants from the

same country of origin decreases the probability to naturalize by more than 3 pp among men and 4 pp among women.[43] The result is consistent with Portes and Curtis' (1987) and Chiswick and Miller's[44] (2009) results. This finding supports the theoretical prediction of a large support group providing access to jobs, friends, and culture which is associated with a lesser need to naturalize. The magnitude of the ethnic enclave coefficient is smaller in the country of origin FE models and completely diminishes in the FE models excluding Mexico. Therefore, it appears that the degree of presence of others from the same country of origin in the current place of residence does not decrease the probability of naturalization among those who are not from Mexico. They may not be as tied to networks specific to their country or origin.

On the other hand, the size of the foreign enclave (percentage of all foreign born in a PUMA), which I use for the first time in the US citizenship literature, is positively associated with naturalization rates. The process of naturalization might be easier in a community with a lot of immigrants, as they might have more information and resources available to them. A 10 pp increase in the foreign population of the PUMA increases the probability of naturalization by about 1.3 pp for men and 1.4 pp for women.[45] Fougere and Safi (2008) find a negative relationship in France and attribute it to longer waiting lines for the administrative portion of naturalization, the current result for the US supports the theory of a community that provides access to information regarding naturalization, may offer language or civic knowledge classes, etc. When the model is estimated using a sample excluding the immigrants from Mexico, the impact of the foreign enclave on the probability to naturalize among men becomes

[43] The Ethnic enclave variable is defined as a percentage and ranges from 0.01% to 58.26%.

[44] Though Chiswick and Miller (2009) use the minority language concentration –% who speaks the same language. When the current study used that measure in the model, the results are similar. However, the linguistic minority measure is correlated with the linguistic distance variable, as well as with the English as an official language variable, furthermore the coefficients are about half the magnitude of the origin measure, and the R^2 is lower. Therefore the measure of Ethnic enclave by origin was chosen in the current study.

[45] The Foreign enclave variable is defined as a percentage and ranges from 0.4% to 81.46%.

insignificant. This suggests that the proximity of other immigrants may not be as important of a factor for naturalization for individuals from countries other than Mexico.

6.4 Country of Origin Characteristics

Among the characteristics of the country of origin, the first determinant discussed is the Sojourner index. It proxies for the propensity to return migrate. As expected, the larger the proportion of people from the same country of origin who lived abroad a year prior to the survey, the less likely one is to naturalize. For a 1 percentage point increase, the probability decreases by approximately 10 percentage points.

The level of income in the country of origin is negatively associated with naturalization and for each ten thousand dollar increase, the probability of naturalization decreases by 4.8 pp among men (7.2pp among women). For example, a male immigrant from Laos where GDP=$698 in 1980 compared to an immigrant from Belgium where GDP=$21,585 would be over 10 pp more likely to naturalize, whereas a female immigrant would be over 15 pp more likely to naturalize. Women may possibly be more sensitive to the economic conditions in the origin, as suggested by Yang (1994). Worse conditions in the country of origin incentivize naturalization. Low civil liberties increase the likelihood of naturalization, compared to those with average values, but the association is insignificant when the model is estimated using the sample excluding the immigrants from Mexico. Men from countries with high civil liberties are more likely to naturalize, perhaps recognizing the benefits of naturalization and the opportunities it presents and they may want to be engaged and exercise their right to become part of their new community. Low political rights in the country of origin increase the probability of naturalization by 6.9 pp among men (3.6 pp excluding Mexico) and 9.4 pp among women (6.2 pp excluding Mexico). The foreign born individuals from countries with high political rights are less likely to naturalize in the samples excluding Mexico (men 5.8 pp, women 3.8 pp) as they may want to return.

The literature also discusses the importance of recognizing dual citizenship, mainly on the country of origin's part, as it decreases the perceived costs of naturalization. Chiswick and Miller (2009) and Zimmerman et al.[46] (2009) find a positive relationship. Yang (1994), Akbari (2008), DeVoretz (2008), and Donkers and Vink (2010) find a negative association. The current study confirms that immigrants from countries that recognize dual citizenship are in fact more likely to naturalize: men by 5 pp and women by 3.7pp (7.4 pp and 6 pp excluding Mexico).

One must demonstrate English proficiency to pass the citizenship exam. Measure of English fluency at the time of survey is endogenous; therefore two alternative controls are employed: English as an official language and linguistic distance. The results in the literature are mixed regarding the role of English as an official language. Yang (1994) finds a negative association, Chiswick and Miller (2009) find a positive relationship for females and Jasso and Rosenzweig's (1986) results are not statistically significant. I find that coming from a country that recognizes English as an official language does indeed increase the probability of naturalization by approximately 1 pp for men and 2.5 pp for women.

The role of linguistic distance in determining naturalization is also positive and fairly large in magnitude at approximately 7 pp for the difference between English and Japanese, or over 3 pp between English and German.[47] This result is consistent with the results of Chiswick and Miller (2009) for females, however it initially appears counterintuitive to theory. One would expect that the harder it is to learn English, the less likely to naturalize; an opposite relationship is found. One possible explanation is that the harder it is to learn English, the more effort it takes, the less likely one would be to disregard that investment and give it up, thus increasing the likelihood of naturalization. Another consideration could be that countries with relatively small linguistic distance such as Germany, France, etc. are more developed and their nationals may be representing foreign corporations in the US in the roles of higher management and CEOs. Therefore, they may be in the US for work on a temporary basis and not to stay

[46] For Muslims only.

[47] The measure of linguistic distance equals 1 for Japanese (the furthest from English) and 0.44 for German.

permanently. Geographic distance indirectly represents the moving costs and is positively associated with the likelihood of naturalization. For each thousand miles between the country of origin's capital and the closes US port, the probability increases by more than 2 percentage points.

Personal characteristics, the characteristics of the country of origin and of the region of residence all appear to be strongly associated with the probability to naturalize. The current study presents several new findings regarding the impact of US education and US specific human capital acquisition on the probability of naturalization.

7. Limitations

There are several variables of interest that would improve the study, if they were available such as information on the history of visa and legal status. If the foreign born arrives legally on a tourist visa, but allows the visa to expire, the status changes to illegal. This person was never in a position to obtain permanent residency, whether legal or not, as tourist visa is not an immigrant visa. S/he might marry a citizen and gain legal status and eligibility for naturalization in the future though. Since the type of visa, the legal status and its history are unknown, some of the observed immigrants may not be eligible for naturalization. It may be due to a nonimmigrant visa or they may be in the US illegally and this possibly introduces a downward bias in determining the probability to naturalize.

A measure of completed fertility would also be desirable. The ACS only captures children under the age of 18 living in the household. Therefore, older children might have moved out and are not captured in the survey. Personal and family characteristics prior to arrival would provide a better insight into the motivation and reasons to migrate. Information regarding the attitude of the immigrant toward naturalization would also improve the model. For example, would they like to naturalize or do they have friends in the host country? Attitudes of the community such as indices measuring whether the

community is friendly and accepting toward foreigners in its policies, and a measure of foreign sentiment would also be helpful, [48] though community attitude may be an intermediate mechanism through which higher education in the US leads to naturalization. Unfortunately, none of these are available in the ACS.

8. Conclusions

This study enriches the citizenship literature by examining the association between completing the highest level of education in the US and naturalization, which is novel to the US citizenship literature. The human capital theory suggests that investments in education may be to some extent country specific and would therefore warrant higher returns. While introducing the notion of country specific human capital, the empirical findings suggest that years of education is a crude proxy for human capital in this context. The impact of acquiring higher education in the United States is significant for those with some college: 2-3 percentage point increase in the probability of naturalization and 2-4 percentage points for those who completed their undergraduate education in the US, which suggests that additional training after high school is country specific and more applicable in the US labor market. Furthermore, the investment in higher education in the United States also increases the stock of social capital and strengthens ties to the community, providing a further incentive to naturalize. The estimated results for US education may also contain elements of unobserved factors that are correlated with US education and naturalization, such as preferences and discount rates. There is no significant impact on naturalization if graduate degree was completed in the US. Certain types of graduate degrees may be more general or the foreign born value and pursue naturalization equally regardless of where they completed their graduate degree in order to secure a future in the US. They had given up a career in the

[48] Similar indices, such as the MIPEX, are available for European countries (Dronkers and Vink, 2012)

country of origin and likely recognize the benefits of naturalization regardless of where their degree was completed.

As a policy suggestion, Chiswick and Miller (2009) mention offering classes to immigrants to improve their language skills and civic knowledge, enlisting into the US military in immigrant communities, and targeting policy to attract immigrants with higher education and families. The current study further suggests promoting college education to immigrants who have already arrived to the US. This investment will increase their commitment to the US and will enhance their opportunities in the labor market, thus providing an incentive to naturalize.

Analysis of the previously utilized factors in the citizenship literature adds to clarifying the associations that have shown conflicting results. The incidence of citizenship increases with the age at arrival and is more likely among those living in a family. The size of an ethnic enclave (by country of origin) is negatively associated with naturalization rates when the sample includes all immigrants. This supports the theory that the ethnic group creates stronger ties to the country of origin, provides enough access to jobs and information among its members and thus makes it less important to naturalize. I also utilize a new measure of diversity in the region of residence. The foreign enclave captures the percentage of all foreign born and the larger it is, the higher the probability to naturalize. This suggests that larger foreign concentration may result in more resources available to the immigrants such as English classes and information centers. However, when Mexican immigrants are excluded from the sample, the associations with both measures of enclaves almost diminish and the proximity of other immigrants may not be as important of a factor for naturalization for immigrants from countries other than Mexico. Furthermore, I confirm that the recognition of dual citizenship by the origin country, as well as English being the official language, also increase the incidence of naturalization.

There are several areas of future research resulting from the current study and newly available data on the timing of naturalization. The ACS 2008-2010 PUMS data set provides information on

marital history and the timing of naturalization, which in turn allows for the identification of citizenship status at marriage. Marriage can be utilized as a pathway to citizenship and for the first time in the census-type literature, the changes in citizenship status of both spouses from marriage to the time of survey are observed. This allows for a more complex analysis of the patterns and changes in citizenship status and is the second chapter of this thesis.

An extension of the current analysis, beyond simply whether one naturalizes, is the study of the duration from arrival to naturalization. The data show that, on average, naturalization occurs more than 11 years after arrival. A hazard analysis of the length of time from arrival to naturalization will be conducted to evaluate the factors determining the timing, which has not been estimated in prior research. This analysis is discussed in the third chapter of this thesis.

In addition, the model of determinants of citizenship will be used to further study the determinants of fertility among the foreign born differentiating by their citizenship status and US specific human capital. In terms of fertility and citizenship status, the relationship can be considered endogenous. The current paper will allow for the study of the impact of citizenship status on fertility decisions using an instrumental variable approach with predicted values of citizenship.

II. MARRIAGE AS A PATHWAY TO US CITIZENSHIP

Marriage is one of the pathways to obtaining US citizenship by naturalization. I examine the association between the number of marriages and naturalization, as well as the association between the citizenship status of husbands and wives and naturalization. I find that among the foreign born, being married at least twice is associated with an increase in the probability of naturalization of approximately 11 percentage points, relative to their otherwise comparable never married counterparts. Furthermore, the existing literature has examined the role of spouse's citizenship in determining naturalization and showed that having a US born spouse is associated with an increase in the probability of naturalization. However, previous analyses were limited because the citizenship status of foreign born spouses was observed only at the time of survey. For married couples in which both partners are foreign born, I am able to identify whether the spouse was naturalized prior to or after getting married, as the year of last marriage is also known. I am the first to document an important stylized fact: I show that the largest increase in the probability of naturalization of 25 percentage points for men and 15 percentage points for women is associated with having a foreign born spouse who was a noncitizen at the time of marriage but is a naturalized citizen at the time of the survey. Although marriage introduces complexity, this study makes a contribution towards an increased understanding of the citizenship process and provides new insights into the dynamics of marriage as a pathway to citizenship.

1. Introduction

Naturalization among the foreign born is viewed as a form of assimilation and is therefore desirable. In order to be eligible to become a naturalized citizen, one must first be a permanent resident. Permanent residency can be gained via employment, family sponsorship, acquisition of refugee status, and marriage to a citizen or a permanent resident. In this paper, I explore the latter pathway to citizenship. The lack of adequate marital history data in previous research has presented a problem for the empirical analyses of the determinants of naturalization. Beginning in 2008, unlike the US Census (used by Akbari, 2008; Bloemraad, 2002; Chiswick and Miller, 2009; Jones-Correa, 2001; Mazzolari, 2009; Yang, 1994) the American Community Survey data (ACS) provide information on marital history and the timing of naturalization for both the respondents and their spouses. The richer data allow for novel analyses.

I examine two main associations. First, the association between the number of marriages and naturalization. Second, the association between the citizenship status of husbands and wives and naturalization. With regard to the first association, the newly available information on marital history allows me to separately identify the foreign born who have never been married, have been married once, and have been married at least two times. I hypothesize that if marriage is utilized as a pathway to citizenship, higher rates of citizenship would be observed among the foreign born individuals who have been married more than once, as they could have utilized the first marriage to gain permanent residency and later marry for love. The results show that the probability of naturalization is approximately 11 percentage points higher among foreign born individuals who have been married multiple times, compared to their never married counterparts. This finding is suggestive of utilizing marriage as a pathway to citizenship.

With regard to the second association, the existing literature has examined the role of spouse's place of birth in naturalization and shows that having a US born spouse is associated with an increase in the probability of naturalization. However, to date, the analysis of marriage as a pathway to citizenship has been limited because citizenship status of the foreign born individuals has been observed only at the time of survey and not at the time of marriage. Utilizing the richer ACS data which include the year of last marriage and the year of naturalization, I am able to identify the citizenship status of both spouses at the time of the most recent marriage. In order to evaluate the extent to which marriage may have been utilized as a pathway to citizenship, I create a set of four mutually exclusive and collectively exhaustive binary variables identifying the citizenship status of the spouse at marriage and at survey. The categories include: spouse born in the US; spouse naturalized citizen at the time of marriage; spouse noncitizen at the time of marriage but naturalized at the time of survey; and spouse noncitizen at the time of marriage and still noncitizen at the time of survey.

Empirically, I show that the highest rate of naturalization is associated with having a foreign born spouse who was a noncitizen at the time of marriage but is a naturalized citizen at the time of the survey. The probability of naturalization is approximately 25 percentage points higher for men and 15 percentage points higher for women, relative to their counterparts with a US born spouse. While these relationships may be reciprocal and omitted factors such as preferences and discount rates may impact both marriage and naturalization which present an identification challenge, multivariate regressions aimed as descriptive analyses along with frequency distributions are presented to provide new insight into the dynamics of marriage as a pathway to citizenship.

Historically, marriage has always played a role in gaining US citizenship. As summarized in Bloemraad and Ueda (2005), in the late 1800s a white foreign born woman automatically became a citizen upon marriage to a US citizen, regardless of her wishes. In the early 1900s, the Expatriation Act strengthened this link to a husband: if a citizen woman (naturalized or US born) married a foreign born man, she lost her citizenship. This provision was renounced by the Cable Act of 1922 resulting in men and women having to apply for citizenship independently (Sapiro, 1984). This change was not universally applied as Asian women were not legally permitted to gain US citizenship and women who married Asian men continued to lose their US citizenship until 1931 (Bredbrenner, 1998). Since then, all men and women, regardless of their country of origin or race, apply for US citizenship independently.

This paper builds on the naturalization process model presented in Chapter 1, in which personal characteristics, characteristics of the country of birth and of the destination region in the United States are shown to be important factors associated with the acquisition of citizenship. The focus of this chapter is on marriage as a pathway to citizenship, and this is a brief outline. Section 2 sets up the conceptual framework by discussing the possible ways of obtaining legal permanent residency in the United States, which is necessary in order to become eligible for naturalization. Section 3 describes the

data, identifies the sample restrictions and presents the descriptive statistics. Section 4 outlines the estimation model, and the results are presented in section 5. Section 6 summarizes, acknowledges the limitations, and concludes the paper.

2. Conceptual Framework

This section outlines the possible ways the foreign born can become permanent residents of the United States and thus be eligible to naturalize. The link between marriage and gaining permanent residency is explored and the contribution to the literature is highlighted.

2.1 Legal Permanent Residency

The foreign born may acquire US citizenship by naturalization. However, in order to be eligible for naturalization, one must first be a legal permanent resident, also known as "green card" recipient. The ACS data do not indicate which noncitizens have legal permanent residency status, which have non-immigrant visas, and which may be in the US illegally.[49] Non-immigrant visas are intended for temporary stay and among others include tourist, student, artist, and business visas.[50] Non-immigrant visa holders are not eligible for permanent residency without a status adjustment. The lack of visa information in data such as the Census is considered to be a major flaw for the study of naturalization by Jasso and Rosenzweig (1986). Unfortunately, data with visa information are not readily available and thus the Census-type data have been widely used. Marriage to a US citizen or permanent resident warrants a status adjustment to permanent residency for the undocumented and non-

[49] The U.S. Department of Homeland Security (2011) estimates the total number of unauthorized immigrants to be 11.5 million, about 1/3 of the foreign born in the US. Around 70% of the illegal immigrants arrived to the United States after 1995 and 60% are between the ages of 25 and 44. Most unauthorized immigrants come from Mexico (more than 10x compared to the other countries), with California and Texas being the top receiving states.

[50] Fiancé(e) of US citizen visas are also considered non-immigrant visas while awaiting permanent residency.

immigrant visa holders. Taking advantage of the richer marital history information in the ACS data, in this study I explore the possibility of utilizing marriage as a pathway to naturalization.

According to the Office of Immigration Statistics Annual Flow Report (March, 2013) in 2012, a total of 1,031,631 persons became legal permanent residents of the United States. US law prioritizes those related to a US citizen or legal permanent resident, those with desirable job skills, refugees or those with an asylee status, or those who come from countries that have had very little recent immigration to the United States. The foreign born individuals who already reside in the United States, whether they have a temporary non-immigrant visa or are undocumented, can apply for adjustment of status if they qualify for legal permanent residency. They represent slightly more than half of the new legal permanent residents, whereas approximately 47 percent are new arrivals.

There are annual limits for the legal permanent resident categories ranging from 416,000 to 675,000 per year and there is also a per-country limit equal to seven percent of the total number of family and employment sponsorships. The limit on refugee visas was set at 76,000 in 2012 and is determined by the President and the Congress. The Diversity Visa Program has a limit of 50,000 (3,500 per country) and is available if there were fewer than 50,000 permanent residents in the previous five years from that particular country of origin. Employment sponsorship represented 14 percent of the new legal permanent residents in 2012 and has a limit of 140,000, plus unused family visas from the previous year. The categories of workers considered are: priority workers; professionals with advanced degrees; skilled workers without advanced degrees and needed unskilled workers; special immigrants (religious workers); and employment creation immigrants (investors).

There are four distinct categories of family sponsorship that are subject to limits which range from 226,000 to 480,000. They are unmarried children of US citizens and the unmarried children's offspring; married children of US citizens and the married children's spouses and offspring; adult siblings of US citizens and the siblings' spouses and children; and spouses, children, and offspring of

unmarried children of lawful permanent residents. Some legal permanent resident categories do not have annual limits. By far the largest is the immediate relative category – spouses, children[51] and parents of US citizens – which accounted for 46 percent of the permanent residents in 2012. Spouses of US citizens were the majority of the immediate relative category and represented 26 percent of all the permanent residents.

I focus on marriage as a pathway to citizenship. The Office of Immigration Statistics Annual Flow Report (March, 2013) points out that 58 percent of the new legal permanent residents were married compared to only 38 percent of the native population. The higher rates of marriage among the new permanent residents are suggestive that marriage may indeed be utilized to gain permanent residency. I identify spouse's citizenship at the time of marriage and at the time of survey to indicate whether the marriage could have provided a pathway to permanent residency and ultimately citizenship. This gives rise to four distinct categories: spouse born in the US (spouse US); spouse naturalized at the time of marriage (spouse Nat/Nat); spouse noncitizen at the time of marriage but naturalized at the time of survey (spouse Non/Nat); and spouse noncitizen at the time of marriage and still noncitizen at the time of survey (spouse Non/Non).

The last category of the family sponsorships which was subject to a limit (spouses and children of lawful permanent residents and their children) includes the foreign born who married a noncitizen permanent resident. The spouse is a noncitizen at marriage and either naturalizes by the time of the survey or does not. Therefore, they would be classified in one of the latter categories (spouse Non/Nat, spouse Non/Non). One would expect that spouses who are eligible would most likely naturalize (spouse Non/Nat) and that spouses who are not eligible would remain noncitizens (spouse Non/Non). The largest of the immediate relative categories which is not subject to a limit (spouses, children and parents

[51] Includes foreign adoptions and accounted for 7.9 percent of the legal permanent resident admissions in 2012.

of US citizens) includes the foreign born who married a citizen. They would be classified either as married to a US born citizen (spouse US) or as married to a naturalized citizen (spouse Nat/Nat).

2.2 Marriage and Characteristics of the Spouse

Some of the foreign born individuals are not permanent residents and came to the United States on a non-immigrant visa or possibly entered illegally. These individuals do not have a direct pathway to gaining permanent residency. It is especially difficult to become documented once the person's temporary visa expires. Nonetheless, marrying a US citizen permits an undocumented person to apply for an adjustment of status and the immediate relative category has no set limits on the number of foreign born who can acquire permanent residency. Therefore, if one does not have an immigrant visa and is not a permanent resident, s/he could find a potential spouse who is a citizen. This would allow the individual to become eligible for permanent residency, which would eventually lead to the eligibility for naturalization. If one marries a permanent resident, s/he would be subject to the family sponsorship quota and the waiting period may be longer. Marrying a spouse who has a pathway to permanent residency, such as employment sponsorship, extends the process even further, but is still an avenue for gaining permanent residency. When the employment sponsorship becomes effective and the status adjustment is processed, spouses may become eligible for the status adjustment at the same time as the person who is sponsored.

The ACS data, unlike the previously utilized data sets, do indicate the number of times a person has been married, irrespective of current marital status. I create a set of mutually exclusive variables: never married, married one time, married two times or more. I hypothesize that if marriage is utilized as a pathway to citizenship, higher rates of divorce and remarriage would be observed. Furthermore, if the foreign born gain permanent residency via marriage, the expectation is that those who have been married would have higher rates of citizenship. This prediction would apply even more to individuals who have

been married more than once, as they could have utilized the first marriage to gain permanent residency and later marry for love.

The existing evidence regarding the association between naturalization and being married at the time of the survey is mixed, which is not surprising given the problems in this marital status measure. Several studies show no significant association between marital status at the time of survey and naturalization: Bloemraad (2002) in Canada, Evans (1988) in Australia, Chiswick and Miller (2009) in the US, Fougere and Safi (2008) in France, Portes and Curtis (1987) among legal Mexican immigrants in the US, Zimmermann et al. (2009) in Germany. On the other hand, some studies show a negative association: DeVoretz and Pivnenko (2004, 2005) using Canadian Census data, while Yang (1994) shows a positive association in the US.

The evidence on having a US citizen spouse in particular is more consistent. The findings in the literature suggest a positive association with naturalization (Jasso and Rosenzweig, 1986; Portes and Curtis, 1987). Chiswick and Miller (2009) find a positive association with naturalization among women with US born husbands but the association with naturalization is not statistically significant among men with US born wives.[52] Marriage to a citizen provides a pathway to gaining eligibility for permanent residency and later naturalization, and it shortens the waiting time. The US born spouse may also encourage the respondent to naturalize. In prior studies citizenship status was observed only as of the time of the survey. If the spouse was foreign born, it was impossible to determine whether s/he was naturalized at the time of marriage.

[52] I replicate their results using the ACS data and find that having a US born spouse is associated with an increase in the probability of naturalization of 4.5 pp among women. This result was as expected, as marriage to a US born guarantees a pathway to permanent residency and naturalization. Chiswick and Miller (2009) find that a negative association between a US born spouse and naturalization, though insignificant, for men. I find that among men, being married to a US born spouse is indeed associated with a 1pp decrease in the probability of naturalization. The previous research was unable to identify the citizenship status of the spouse at the time of marriage. It is therefore possible, that the foreign born spouses may have been naturalized citizens at the time of marriage and could have offered the same pathway to naturalization as US born citizen spouses could, regardless of the place of birth.

My goal is to capture the complex dynamic of the relationship between the probability to naturalize and the citizenship status of the spouse. I identify the citizenship status of the spouse at the time of the most recent marriage and at the time of the survey by comparing the year of spouse's naturalization and the year of last marriage. For currently married respondents, the mutually exclusive and exhaustive categories of spouses include: spouse born in the US (spouse US); spouse naturalized at marriage (spouse Nat/Nat); spouse noncitizen at marriage but naturalized at survey (spouse Non/Nat); and spouse noncitizen at marriage and still a noncitizen at survey (spouse Non/Non). The model includes categories of spouse by his/her citizenship at marriage and at survey to highlight the possible pathway to permanent residency and naturalization. Having a citizen spouse is expected to be associated with an increase in the likelihood of naturalization, while having a noncitizen spouse is expected to be associated with a decrease in the likelihood of naturalization.

An important consideration is that individuals who are naturalized citizens might be sought out in the marriage market because of their citizenship status. This gives rise to the possibility of citizenship status affecting marital status and thus a reciprocal relationship. The hypothesis of utilizing marriage in order to gain permanent residency and thus eligibility to naturalize is also tested on a restricted sample of foreign born who arrived to the US as unmarried noncitizens and are currently married for the first time. This specification is used as a robustness check; for this subsample, a previous marriage could not have influenced the respondent's current citizenship status. In addition, there are other factors that may affect both marriage and naturalization, such as having children. Children may lead to, or be a result of marriage, and their presence may also increase the probability of naturalization, as the parents seek to provide a secure future for the family. Individuals who are ready to settle down may also be more likely to marry and to naturalize.

While the current study aims to fill a gap in the literature by adding consideration of marital history, as well as by exploring the role of marital status and spouse's characteristics in further detail,

this study does not claim a causal relationship and simply aims to shed some additional light on the associations. The next section describes the data set and presents descriptive statistics.

3. Data

I use the American Community Survey 2008-2010 PUMS. The data provide information on basic demographic and socioeconomic variables and include over nine million individual observations. In the ACS, as was true for the Census, the foreign born individuals are identified as either naturalized citizens or noncitizens. Some of the noncitizens may be ineligible for naturalization, as discussed earlier in the paper. The data sets do not identify the categories of noncitizens separately. Nevertheless, as of 2008, the ACS reports the number of times married which may shed light on the utilization of marriage as a pathway to citizenship. Furthermore, the year of naturalization and the year of last marriage for all individual members of the households are also reported. This allows me to identify the citizenship status of the spouse at marriage among the currently married individuals. The spouse is identified using a household indicator and the characteristics of the spouse are transformed into a set of variables associated with the respondent. The ACS data set is therefore an improvement over the Census data predominantly used in the existing naturalization literature. The following descriptive results regarding marital history and citizenship status of the spouse highlight the role of marriage as one of the possible pathways to US citizenship.

3.1 Sample Restrictions

The 2008-2010 ACS PUMS data are restricted to include only respondents born outside of the United States to parents who were not US citizens, arrived as adults[53] (18 or older), were not

[53] Those who arrive as children might have a claim to citizenship based on their parents' status, and naturalization would therefore not represent their own choice as they would follow a different path to citizenship (Mazollari, 2007).

naturalized prior to arrival to the US, are between the ages of 25 and 64 at the time of the survey, and have lived in the US for at least 5 years or 3 years for those married to US citizens and those who served in the US military. This restriction should ensure that the sample includes mostly the immigrants with a choice to naturalize. The main sample contains 446,096 respondents (211,096 males and 235,000 females)

As a robustness check for exploring the role of spousal characteristics on the probability of naturalization, I also estimate the model using a subsample which is further restricted to those who arrived as unmarried noncitizens, and as of the survey date are married and had never had a previous marriage. This restriction leads to 130,337 observations (64,184 males and 66,153 females).

3.2 Descriptive Statistics

The main sample consists of 446,096 adult foreign born. Table VII presents the means of characteristics used as controls in the estimation (OLS FE - fixed effect, country of origin) for the full sample and also separately by the main variables of interest – presence of spouse, and among married respondents, citizenship status of spouse. In order to capture the role of marital history, a set of binary indicators is included for whether the individual has been married only once (75%), multiple times (13%), or has never been married (12%). The number of marriages is known for all observations, including individuals who are currently separated, divorced, or widowed.

Sixty-seven percent of the foreign born are currently married with a spouse present at the time of survey. For these individuals, spousal characteristics can be observed and are included in the estimation. A set of four mutually exclusive binary variables identifying the characteristics of the current spouse is created: spouse born in the US (US 13%); spouse was a noncitizen at the time of marriage and still is a noncitizen at the time of the survey (Non/Non 26%); spouse was a noncitizen at the time of marriage but is naturalized at the time of the survey (Non/Nat 21%); and spouse is already a naturalized citizen at the

time of marriage (Nat/Nat 7%). There is a clear pattern of assortative mating, as the foreign born are more likely to marry foreign born. Thirteen percent of the sample is currently married to a US born spouse and 54% to a foreign spouse.

TABLE VII: MEANS OF SELECTED VARIABLES BY CHARACTERISTICS OF SPOUSE

	Full Sample	No Spouse	Non/Non Spouse	Non/Nat Spouse	Nat/Nat Spouse	US Spouse
	Mean	Mean	Mean	Mean	Mean	Mean
Naturalized citizen	0.45	0.37	0.18	0.83	0.67	0.48
Characteristics of current household [a]:						
Married: US spouse	0.13					
Nat/Nat	0.07					
Non/Nat	0.21					
Non/Non	0.26					
Family, no spouse	0.23					
Lives alone	0.06					
Non-family household (omitted)	0.04					
Marital history:						
Married 1 time	0.75	0.52	0.89	0.91	0.78	0.75
Married 2x or more	0.13	0.11	0.11	0.09	0.22	0.25
Never married (omitted)	0.12					
Personal Characteristics:						
Male	0.47	0.47	0.52	0.49	0.39	0.40
Age at arrival	27.79	27.86	28.20	28.27	26.31	26.67
Years since migration	17.74	17.03	14.84	21.77	18.53	18.44
Other language at home	0.87	0.87	0.93	0.92	0.89	0.68
Served US military	0.01	0.01	0.01	0.02	0.01	0.02
Spouse's education (if married)	12.78		11.36	13.32	13.64	14.39
Education	12.21	11.41	11.50	13.16	13.27	13.65
Less than HS (omitted)	0.33	0.39	0.41	0.25	0.22	0.18
High school	0.18	0.20	0.17	0.16	0.17	0.17
Some college	0.18	0.18	0.13	0.19	0.24	0.25
Undergraduate	0.17	0.14	0.14	0.21	0.23	0.22
Graduate	0.14	0.09	0.14	0.18	0.14	0.17
Completed in US	0.07	0.07	0.04	0.07	0.11	0.10
Some college	0.02	0.03	0.01	0.02	0.03	0.03
Undergraduate	0.02	0.02	0.01	0.02	0.04	0.03
Graduate	0.03	0.02	0.02	0.03	0.04	0.04
US Region Characteristics:						
Urban	0.13	0.15	0.13	0.13	0.13	0.07
South	0.32	0.32	0.35	0.28	0.29	0.36
Ethnic enclave (%)	6.95	7.77	8.92	5.76	5.16	3.64
Foreign enclave (%)	28.96	31.10	28.89	30.35	30.53	20.33
Observations	446096	147026	117761	95716	29092	56501

Source: 2008-2010 ACS PUMS. Sample is restricted to the foreign born aged 25-64 at time of survey who immigrated at age 18, were not naturalized prior to arrival and who have resided in the United States for five or more years (3 years for those who served in the US military or are married to a US citizen).

[a] Characteristics of the household categories are mutually exclusive and collectively exhaustive.

The first row of Table VII indicates that while on average 45% of the sample is naturalized, the lowest rate of 18% is observed among individuals with a noncitizen spouse. This statistic suggests that marriage may in fact be linked with rates of naturalization and provides a possible pathway. Foreign born who marry a noncitizen are not able to utilize that pathway and have the lowest observed rates of citizenship. Sixty-seven percent of individuals who married a naturalized citizen are naturalized, and 48% of individuals whose spouse was born in the US are naturalized. The highest rate of citizenship, 83%, is observed among individuals who married a noncitizen who is naturalized at the time of the survey. Thirty-seven percent of currently unmarried respondents are naturalized. They may have previously been married or have gained permanent residency via other types of sponsorship (employment, family, refugee, etc.).

The rate of citizenship among respondents who have never been married is 25.13%, as shown in the Total row of Table VIII. Regardless of current marital status, the rate of citizenship is 46.70% among individuals who have been married one time, 55.87% among individuals who have been married twice, and 62.41% among individuals who have been married at least three times (averaging 56.62% for those married at least twice). It may appear that the higher rate of citizenship for individuals who have been married multiple times may be associated with age, as divorcees are likely to be older. However, when comparing the rates of citizenship holding age constant, the pattern persists.

TABLE VIII: RATE OF US CITIZENSHIP BY MARITAL HISTORY AND AGE

Age	Rate of Citizenship		
	Never Married	Married 1x	Married 2x or more
25-30	10.81	15.25	19.77
31-40	16.33	29.06	37.41
41-50	33.36	48.63	53.83
51-60	49.54	62.68	64.77
Over 60	58.99	70.23	70.81
Total	25.13%	46.70%	56.62%
Observations	54,169	333,344	58,583

Source: 2008-2010 ACS PUMS. Sample is restricted to the foreign born aged 25-64 at time of survey who immigrated at age 18, were not naturalized prior to arrival and who have resided in the United States for five or more years (3 years for those who served in the US military or are married to a US citizen).

It is true that incidence of citizenship increases with age, yet it is higher by a wide margin for those who have been married at each age group. Due to the identification challenges, the direction of causality cannot be determined, but the positive association between the number of marriages and rate of citizenship is clearly present.

While 48.18% of the foreign born who have ever been married are currently naturalized, the data reveal that only 8.51% were naturalized citizens at the time of their last marriage. [54] Table IX highlights the contribution of the current study, which considers marriage as a pathway to citizenship. The information on citizenship status of the spouses at the time of survey and at the time of marriage is utilized and rate of citizenship is presented as a total and separately for males and females.

[54] Calculated from full sample of data, table not reported.

TABLE IX: RATE OF US CITIZENSHIP BY CHARACTERISTICS OF THE HOUSEHOLD

Characteristics of current household		Rate of Citizenship		
		Males	Females	Total
Married to:	US born	43.12	51.36	48.03
	Naturalized at marriage	65.90	67.65	66.97
	Noncitizen at marriage & naturalized at survey	85.66	80.27	82.89
	Noncitizen at marriage & at survey	21.33	14.92	18.28
Family, no spouse		27.93	41.41	35.62
Lives alone		41.58	55.89	48.60
Non-family household		24.05	38.55	29.48
Total		43.10	47.43	45.38
Observations		211,096	235,000	446,096

Source: 2008-2010 ACS PUMS. Sample is restricted to the foreign born aged 25-64 at time of survey who immigrated at age 18, were not naturalized prior to arrival and who have resided in the United States for five or more years (3 years for those who served in the US military or are married to a US citizen).

Previous literature examined the association between having a foreign born spouse vs. a US born spouse. Chiswick and Miller (2009), Jasso and Rosenzweig (1986) and Portes and Curtis (1987) find a positive association between naturalization and having a US born spouse. I clearly show in Table IX that the dynamic is not as simple as foreign vs. native spouse. The highest rate of citizenship is not observed among individuals married to US born spouses.

Approximately 48% of the foreign born individuals who married a US born citizen are naturalized (higher rate observed among women). Among individuals who married a naturalized citizen, 66.97% are naturalized. The highest rate of naturalization, 82.89%, is observed among those who married a noncitizen who has become a naturalized citizen during the marriage (Non/Nat). The spouse likely had a path to citizenship which could be a joint path, or one of the spouses may have become eligible and sponsored the other. The lowest rate of citizenship of all the household categories, 18.28%, is observed for individuals who married a foreign born noncitizen spouse likely without a path to citizenship as the spouse is still not naturalized at the time of the survey (Non/Non).

All remaining current household categories have higher rates of citizenship than individuals who are married to a noncitizen spouse. Furthermore, the rate of citizenship for the remaining categories is

higher among women. In families with no spouse present (family, no spouse category), 41.41% of women are naturalized compared to 27.93% of men. Single women living alone are also more likely to be naturalized than their male counterparts: 55.89% vs. 41.58%. In non-family households, 38.55% of women are naturalized and only 24.05% of men are naturalized. Yang (1994) attributed higher naturalization rates among women to gaining independence and opportunities not available in their countries of origin.

The tables of means presented in this section show that a relatively high rate of citizenship is observed among individuals who have been previously married, and also among individuals who are currently married to a foreign born spouse who became naturalized during marriage (Non/Nat). While marital status and spouse's citizenship status may be endogenous and several characteristics that may impact marital variables and naturalization, such as discount rates and the presence of children, are not observed, multivariate analysis is conducted with no causal claim, simply to isolate the associations with naturalization, holding other factors constant. The estimation method is presented in the next section.

4. Estimation Model

The models are estimated using the full sample of the foreign born who met the restrictions outlined in the Data section. Since marriage is a pathway to permanent residency and ultimately naturalization for everyone, even for individuals who may be undocumented, there is no reason to exclude immigrants from Mexico. The model is estimated using OLS which permits for fixed effect (FE) estimation, controlling for country of origin. The first chapter of this thesis shows that the results of the OLS FE models differ slightly from the basic OLS and probit estimations, which suggests that some of the characteristics may be correlated with the country of origin. Since some immigration policies and permanent resident quotas are country specific, I report the OLS FE estimation results.

Based on previous literature, separate equations for males and females are estimated to allow for differences by gender. The specifications control for all relevant, observed factors identified in the first chapter of this thesis, which developed the considerations of the individual determinants, including controls for US education. They are presented in Table VII in the Data section.

The goal of this paper is to identify whether the number of marriages and the citizenship status of the spouse are associated with the probability of naturalization among the foreign born in the United States. Marital history is identified by three mutually exclusive and collectively exhaustive dichotomous variables: never married (omitted), married 1 time, and married 2 or more times. The citizenship of the spouse is identified by four mutually exclusive and collectively exhaustive dichotomous variables: US born (omitted), naturalized at marriage (Nat/Nat), noncitizen at marriage and naturalized at survey (Non/Nat), noncitizen at marriage and at survey (Non/Non). The dependent variable is the probability of naturalization by the date of the survey and X represents a vector of observable characteristics.

$$Y = \beta_0 + \beta_1 X + \beta_2 \text{Married 1} + \beta_3 \text{Married 2 or more} + \beta_4 \text{Nat/Nat} + \beta_5 \text{Non/Nat} + \beta_6 \text{Non/Non} + \varepsilon \quad \text{Eq.4}$$

The main model (model 1) includes both the marital history variables and the detailed characteristics of the current household, which identify the citizenship of the spouse among the married individuals. Marital history is not conditional on the current marital status and applies to all the individuals in the sample. I focus on the specific variables of interest, recognizing that the estimates also capture unobserved characteristics, and that there may not be enough independent variation to capture the separate relationships. In order to alleviate concerns of multicollinearity and to assure the reader that the results of model 1 (which includes both the marital history and current household characteristics) are stable, model 2 includes only the marital history variables and model 3 includes only the characteristics of the current household. As a robustness check, model 4 estimates the model using a

subsample of the data restricted to individuals who arrived to the US as unmarried noncitizens and are currently married for the first time. This sample restriction ensures that the characteristics of a previous spouse could not be associated with the rate of citizenship.

5. Results

This section presents the results of the OLS FE (fixed effect - country of origin) estimations. The personal characteristics and region of residence characteristics listed in Table VII in the Data section are held constant in all the specifications. With regard to the variables of central interest, model 1 includes both the marital history variables and the characteristics of the current household. Model 2 includes only the marital history variables and model 3 includes only the current household characteristics. An equation is also estimated using a subsample restricted to the foreign born who arrived to the US as unmarried noncitizens and are in their first marriage (model 4). The findings are reported in Table X.

Analysis of the marital history variables provides insight to whether the foreign born marry in order to become documented. Marriage does provide a pathway to citizenship for the foreign born who may not have other options such as employment sponsorship. If marriage is utilized as a pathway to citizenship, the foreign born would then likely have been married more than one time: the first time to gain permanent residency, the subsequent time(s) for love. [55]

Marital history is identified by three mutually exclusive and collectively exhaustive dichotomous variables: never married (omitted), married 1 time, and married 2 or more times. Model 1 shows that, compared to individuals who have never been married, having been married one time is associated with a 4.5 pp increase in the probability of naturalization among men and a 7.6 pp increase among women.

[55] It is also possible that foreign born individuals in the US may be more likely to divorce and marry multiple times because of an initial poor match in the US marriage market or because of changing preferences upon arrival to the US.

Higher order marriages are associated with an increase in the probability of naturalization of approximately 11 pp for both men and women – suggestive of utilization of marriage as a pathway to citizenship.

TABLE X: MODELS OF CITIZENSHIP BY GENDER – HOUSEHOLD CHARACTERISTICS AND MARITAL HISTORY

	Male Model 1	Male Model 2	Male Model 3	Male Model 4[a]	Female Model 1	Female Model 2	Female Model 3	Female Model 4[a]
Characteristics of current household:								
Non-family	-0.0759***		-0.1051***		-0.0782***		-0.1137***	
	(0.0050)		(0.0047)		(0.0058)		(0.0056)	
Lives alone	-0.0397***		-0.0629***		-0.0262***		-0.0553***	
	(0.0048)		(0.0046)		(0.0045)		(0.0043)	
Family, no spouse	-0.0600***		-0.0843***		-0.0586***		-0.0857***	
	(0.0039)		(0.0036)		(0.0033)		(0.0031)	
Married, spouse US (omitted)								
Married, spouse Nat/Nat	0.0943***		0.0966***	0.0660***	0.0714***		0.0708***	0.0625***
	(0.0050)		(0.0049)	-0.0074	(0.0040)		(0.0040)	-0.0059
Married, spouse Non/Nat	0.2504***		0.2402***	0.2476***	0.1493***		0.1407***	0.1283***
	(0.0037)		(0.0036)	-0.0055	(0.0032)		(0.0031)	-0.005
Married, spouse Non/Non	-0.1636***		-0.1665***	-0.1820***	-0.2496***		-0.2523***	-0.2717***
	(0.0035)		(0.0035)	-0.0049	(0.0031)		(0.0030)	-0.0047
Marital history:								
Never married (omitted)								
Married 1 time	0.0445***	0.0641***			0.0759***	0.0671***		
	(0.0030)	(0.0025)			(0.0031)	(0.0027)		
Married 2x or more	0.1090***	0.1054***			0.1124***	0.0979***		
	(0.0040)	(0.0035)			(0.0039)	(0.0035)		
Observations	211096	211096	211096	64184	235000	235000	235000	66153
Adjusted R^2	0.4325	0.4300	0. 3573	0.4403	0.4244	0. 3585	0.4221	0.4373

Source: 2008-2010 ACS PUMS. Sample restricted to the foreign born aged 25-64 at time of survey who immigrated at age 18, were not naturalized prior to arrival and who have resided in the United States for five or more years (3 years for those who served in the US military or are married to a US citizen). OLS FE (country of origin), robust standard errors in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

All the control variables indicated in Chapter 1 and in the Data section are included: Age at arrival, Years since migration, Other language at home, Served US military, Spouse's education (if married), Education (Less than HS (omitted), High school, Some college, Some college in US, Undergraduate, Undergraduate in US, Graduate, Graduate in US), US Region Characteristics (Urban, South, Ethnic enclave, Foreign enclave)

[a] Model 4 is further restricted to individuals who are married for the first time and who arrived as unmarried noncitizens.

Turning now to the second key variable – citizenship status of the spouse, earlier findings in the literature are mixed, as discussed in the first chapter of this thesis. Spouses were simply classified as

either US born or foreign born, as the previous research lacked access to data which would permit identification of the citizenship status of the spouse at the time of marriage. Citizenship status was only observed at the time of the survey, which limited the analyses. The results that follow, along with the descriptive tables presented in the Data section, indicate that the role of spouse's place of birth and citizenship are more complex than previously thought. The analysis below expands the literature by considering the utilization of marriage as a pathway to citizenship.

Utilizing the newly available data on the timing of marriage and citizenship, foreign born spouses are separated into three mutually exclusive categories: spouse was a naturalized citizen at marriage (Nat/Nat), spouse was a noncitizen at marriage and is naturalized at survey (Non/Nat), and spouse was a noncitizen at marriage and is still a noncitizen at the survey (Non/Non). Foreign spouses who were naturalized at the time of marriage (Nat/Nat) offer the shortest and most direct pathway to permanent residency and ultimately naturalization, equivalent to a pathway offered by a US born citizen. Spouses who were noncitizens at marriage and became naturalized citizens by the time of the survey (Non/Nat) may have already been permanent residents at marriage or may have had a pathway such as employment sponsorship to gaining citizenship. Alternatively, the spouses may have had a joint pathway or the spouse may have been aided by the respondent in gaining eligibility for naturalization.

For the set of binary variables indicating characteristics of the current households, the foreign born married to a US born spouse are the reference category. Being married to a naturalized citizen (Nat/Nat) is associated with an increase in the probability of naturalization of approximately 9.4 pp among men and 7.1 pp among women. If marriage is utilized as a pathway to permanent residency, especially in form of an agreement, it is possible that such arrangements may be made more frequently with a foreign born individual – someone more sympathetic to the difficult situation of being undocumented. It is also possible that individuals married to a US born spouse do not feel the need to naturalize as they may feel relatively safe as permanent residents. On the other hand, if the couple

consists of two foreign born, they may feel safer if naturalized, due to the threat of deportation or complications when travelling.

Having a spouse who was a noncitizen at the time of marriage but who is naturalized at the time of survey (Non/Nat) is associated with a 25 pp increase in the probability of naturalization among men and a 15 pp increase among women, relative to their counterparts with a US born spouse. The spouse may have been a permanent resident at marriage and became a citizen sometime during the course of the marriage, thus enabling sponsorship of the respondent. It is also possible that the respondent him/herself was eligible for naturalization, and offered a pathway to citizenship to the spouse. A third possibility is that both spouses applied for naturalization jointly, sharing some of the costs of this process.

A spouse who was a noncitizen at the time of marriage and who is still a noncitizen at the time of the survey (Non/Non) is the last category of foreign spouses. Among men, having a noncitizen spouse is associated with approximately 16 pp lower likelihood of naturalization, relative to those married to a US born spouse. Among women, having a noncitizen spouse is associated with a 25 pp lower likelihood of naturalization. When the spouse remains a noncitizen, the marriage pathway to permanent residency and ultimately citizenship is likely not available or the couple lacks the desire to commit to the US. Both the highest and the lowest associations with the probability of naturalization are observed among individuals with foreign born spouses (Non/Nat and Non/Non). Clearly, the place of birth of the spouse is not uniformly indicative of the probability to become a naturalized citizen, as was previously implied in the literature. The present results show that a key factor is whether the foreign born spouse naturalized or not. This explains the mixed findings in the earlier literature, as one would expect differences across samples in the proportion of foreign born spouses who had naturalized.

When examining the remaining categories of the current household, I find that men who live alone are 4 pp less likely to be naturalized compared to otherwise comparable men who are married to a US citizen. Among women, the associated decrease in the probability is approximately 2.6 pp. Living

in a nonfamily household is associated with almost 8 pp lower probability of naturalization, significantly different from living alone. Living alone possibly signals having a better job which would allow one to live on one's own and thus a higher incentive to naturalize, compared to those living in non-family households who may be living with roommates. Respondents who live in a family household without a spouse (single parent or spouse not present) are approximately 6 pp less likely to be naturalized than those married to a US born spouse.

The results of model 1, which includes both the characteristics of the current household and marital history, are robust to the changes in specification. Model 2 includes only marital history and model 3 includes only the current household characteristics. Furthermore, in order to limit the concern that the foreign born naturalized citizens are sought out for their citizenship status in the marriage market, the model is also estimated using a sample further restricted to the foreign born who arrived to the US as unmarried noncitizens and are currently married for the first time[56]. Therefore, characteristics of a former spouse could not have been associated with the probability to naturalize. The results are presented as model 4. Inspection of Table X shows that all the qualitative conclusions described above for model 1 hold also in the alternative specifications of models 2, 3, and 4. The stability of the marital history and spouse's citizenship coefficients reduces the multicollinearity concerns.

The first chapter of this thesis examined the impact of completing higher education in the US on naturalization. One of the possible channels via which US education may impact the probability of naturalization was meeting a future spouse, most likely a US born spouse, in college. As presented in Table XI, the estimated increases in the probability of naturalization associated with US education do not diminish when the characteristics of the household and marital history controls are included in the model. In fact, the positive associations slightly increase. Therefore, it appears that the increased

[56] The marital history variables (never married, married 2x or more) as well as the remaining household categories (lives alone, non-family household, family/no spouse) are not applicable in this model since everyone in this sub-sample is currently married for the first time.

probability of naturalization for individuals who completed their higher education in the United States is not driven by the choice of a spouse.

TABLE XI: MODELS OF CITIZENSHIP BY GENDER – US EDUCATION WITH HOUSEHOLD CHARACTERISTICS AND MARITAL HISTORY

	Male OLS FE Chapter 1	Male OLS FE Marital controls	Female OLS FE Chapter 1	Female OLS FE Marital controls
High School	0.0707***	0.0582***	0.0786***	0.0654***
	(0.0027)	(0.0026)	(0.0026)	(0.0025)
Some college	0.1354***	0.1068***	0.1538***	0.1265***
	(0.0031)	(0.0030)	(0.0028)	(0.0028)
Some college*US	0.0180**	0.0313***	0.0265***	0.0312***
	(0.0066)	(0.0065)	(0.0061)	(0.0060)
Undergraduate	0.1434***	0.1168***	0.1625***	0.1340***
	(0.0034)	(0.0033)	(0.0030)	(0.0030)
Undergraduate*US	0.0224***	0.0406***	0.0225***	0.0283***
	(0.0065)	(0.0064)	(0.0060)	(0.0059)
Graduate	0.1292***	0.1097***	0.1312***	0.1164***
	(0.0035)	(0.0035)	(0.0036)	(0.0036)
Graduate*US	-0.0073	0.0055	-0.0034	-0.0018
	(0.0053)	(0.0050)	(0.0060)	(0.0056)
Observations	211096	211096	235000	235000
Adjusted R^2	0.3561	0.4325	0.3568	0.4244

Source: 2008-2010 ACS PUMS. Sample restricted to the foreign born aged 25-64 at time of survey who immigrated at age 18, were not naturalized prior to arrival and who have resided in the United States for five or more years (3 years for those who served in the US military or are married to a US citizen). Robust standard errors in parentheses, $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$. All controls specified in the Data section are included.

Model is estimated with interaction terms for US education to test for significance at each level of college education. For example, β2 is reported for individuals who completed some college in the US (β1 SomeCollege + β2 SomeCollege*USedu) and represents the additional increase in the probability of naturalization for individuals who completed some college in the US relative to their otherwise comparable counterparts who completed it in the country of origin.

The results presented in this section are suggestive of the utilization of marriage as a pathway to citizenship. Men who have been married one time are 4.5 pp more likely to have naturalized and women are 7.6 pp more likely to have naturalized, relative to their never married counterparts. Furthermore, having been married at least twice is associated with an 11 pp increase in the probability of naturalization, compared to the foreign born who have never been married. The citizenship of the

spouse also makes a difference, as citizen spouses (or those with a pathway to citizenship) provide access to gaining permanent residency and ultimately citizenship. The previous research reported that having a US born spouse is associated with a higher probability of naturalization. The present findings show that when taking the citizenship status of the foreign born spouse into consideration, being married to a US born spouse is not associated with the highest probability of becoming naturalized. Instead, the highest increase in the probability is associated with having a spouse who was not naturalized at the time of marriage but became a citizen prior to the survey. The following section summarizes the results and concludes the paper.

6. Conclusions

The goal of this paper is to examine whether marriage to a citizen may be utilized to gain permanent residency as a pathway to becoming a US citizen via naturalization. I aim to identify whether the number of marriages and the citizenship status of the spouse are associated with the probability of naturalization among the foreign born in the United States. Prior research was only able to observe the marital and citizenship status at the time of the survey, and was therefore unable to determine whether the foreign born spouse was a citizen at the time of marriage. The 2008-2010 ACS PUMS data provide new information on the number of marriages, the timing of the most recent marriage and the timing of naturalization. For the first time in the census-type literature, the changes in citizenship status from marriage to the time of the survey are observed. This allows for an improved analysis of naturalization in the US.

If the foreign born indeed utilize marriage as a pathway to citizenship, we would likely observe multiple marriages. The initial marriage would provide access to permanent residency, and subsequent unions would be out of love. Even if the initial marriage is not a contractual convenience marriage with

the sole purpose of becoming documented, the marginal cost of search for a more suitable match among citizens would likely be very high in such a limited marriage market and thus result in lower compatibility and higher likelihood of divorce. Previous research utilizing the Census data was unable to observe marital history. The ACS, as of 2008, reports the number of times married, and I create a set of mutually exclusive and exhaustive variables to capture the role of marital history in the probability to naturalize. The empirical analysis shows that being married one time is associated with a 5-7 pp increase in the probability to naturalize, and being married multiple times is associated with an 11 pp increase in the probability to naturalize – relative to their otherwise comparable never married counterparts. These results are suggestive of marriage being utilized as a pathway to citizenship.

To capture the dynamic changes in citizenship status, the current spouses of respondents who were married as of the survey date are identified by four mutually exclusive and collectively exhaustive dichotomous variables: US born (spouse US - reference), naturalized at marriage (Nat/Nat), noncitizen at marriage and naturalized at survey (Non/Nat), noncitizen at marriage and at survey (Non/Non). Based on previous literature, separate equations for males and females are estimated to allow for differences by gender. I find that being married to a noncitizen (Non/Non) is associated with the lowest likelihood of naturalization. Men who are married to a noncitizen wife are 16 pp less likely to naturalize compared to men with US born wives. Women with noncitizen husbands are 25 pp less likely to naturalize relative to their otherwise comparable counterparts with US born husbands. For such individuals, the pathway to gaining permanent residency via marriage is most likely not available, as the spouse is a noncitizen, and results in significantly lower probability of naturalization.

Marrying a foreign born naturalized citizen (Nat/Nat) is associated with a 10 pp increase in the probability to naturalize among men and a 7 pp increase among women, relative to their otherwise comparable counterparts married to a US born citizen. The higher probability of naturalization associated with a foreign born citizen spouse compared to a US born citizen spouse suggests that

convenience marriages may be more common among the foreign born. While a marriage with the sole purpose of gaining permanent residency in the absence of a romantic relationship is illegal, it is likely that the idea of getting married in order to gain permanent residency in the United States is a more acceptable arrangement among the foreign born themselves. They understand the consequences of being undocumented and may be more sympathetic, whereas a US born citizen may not be willing to become involved in such arrangement. It is also possible that individuals married to a US born spouse do not rush to naturalize as they may feel relatively safe as permanent residents. On the other hand, if the couple consists of two foreign born individuals, they may feel safer if naturalized, due to the threat of deportation or the ease of travelling with a US passport.

By far the largest increase in the probability of naturalization, 25 pp for men and 15 pp for women, is associated with a spouse who was a noncitizen at marriage and became a naturalized citizen by the time of the survey (Non/Nat). The spouse may have been a permanent resident and became a citizen during the course of the marriage, thus enabling sponsorship of the respondent. It is also possible that the respondent him/herself was eligible for naturalization, thus offering a pathway to citizenship to the spouse. Alternatively, the couple may have utilized a joint pathway to citizenship and with some of the costs being shared, creating an additional incentive for both spouses to naturalize. These results clearly demonstrate that the role of spouse's characteristics in the naturalization process should not be conceptualized simply as foreign vs. US born.

There are limitations to this research. I am not able to determine which type of visa the foreign born individuals held at arrival or when their status changed and why. Ideally, the data would include such information which would permit addressing endogeneity concerns. Moreover, characteristics of the spouse are available only for individuals who are currently married with a spouse present. If data for former spouses were available for individuals who are remarried, divorced, separated or widowed, the link between marriage and obtaining citizenship could be made clearer. Furthermore, preferences and

forward looking behavior of the foreign born are unobserved and are likely to impact both the marital variables and the probability of naturalization. Since this information is not available, the direction of causality between naturalization and marriage cannot be identified.

While the ACS data do not provide complete histories of marital and visa status, this data set is an improvement over the Census data previously used in the literature and the analyses in this paper shed additional light on marriage as a pathway to citizenship. Utilizing marriage to become a US citizen is a sensitive subject and the results in this study suggest the topic deserves additional research.

III. TIMING OF ACQUIRING US CITIZENSHIP

The previous literature has lacked information on the timing of naturalization which limited the analyses. The availability of the year of naturalization allows me to make two new contributions to this literature. First, previous studies hypothesized that the foreign born individuals who are eligible for citizenship would choose to pursue naturalization early on in order to enjoy the benefits. I test this hypothesis using the newly available information on the timing of naturalization and I find that the probability of naturalization does indeed increase the fastest during the first decade after satisfying the residency requirement. Thereafter, the probability of naturalization continues to rise with time but at a slower rate. Second, I improve the methodology used in previous studies of factors associated with naturalization, including the first two chapters of this thesis, by utilizing the new information on date of naturalization in a hazard analysis. The previous studies estimate the associations between various factors and the probability of naturalization by the survey date. While they provide information on the direction and significance of the associations and the relative importance of each factor, the interpretation of the effects is limited by the lack of information on date of naturalization. Focusing on the role of education acquired in the US vs education acquired in the country of origin, I find that the estimated probability of naturalization at five years since eligibility is 0.20 for men who completed an undergraduate degree in the country of origin, compared to 0.21 for men who completed their degree in the US. The corresponding figures for women are 0.23 and 0.25. The direction of these associations is consistent with expectations.

1. Introduction

Immigration has played an important role in US history. America has attracted people from around the world for its economic opportunities, as well as for its commitment to freedom of choice and human rights. Successful assimilation of the foreign born into the society is important both for the United States and for the immigrants. Becoming a citizen via naturalization is viewed as a form of assimilation and it has the potential to impact a wide range of outcomes (Akbari, 2008; DeVoretz and Pivnenko, 2005; Jasso and Rosenzweig, 1986; Portes and Curtis, 1987; Aleksynska, 2011). The

percentage of foreign born who naturalize varies across countries[57]. Some of the difference in naturalization rates is attributed to the varying demographic composition of the immigrants, while some of it is attributed to institutional differences and the attitude of the government toward immigration (Bloemraad, 2002; Picot and Hou, 2011).

In this chapter, I make two contributions to the literature. First, I test a hypothesis proposed by previous studies that the foreign born individuals who are eligible for citizenship would choose to pursue naturalization early on in order to enjoy the benefits (Chiswick and Miller, 2009; DeVoretz, 2008). The existing literature lacks data on the actual timing of naturalization and only observes citizenship status of the foreign born individuals as of the date of survey. I use the newly available information on the timing of naturalization and find that the probability of naturalization does indeed increase the fastest during the first decade after satisfying the residency requirement. Thereafter, the probability of naturalization continues to rise with time but at a slower rate.

Second, I improve the methodology used to date, including the first two chapters of this thesis, by using the newly available timing information in the ACS within the framework of a hazard analysis. The year of naturalization was not reported prior to the 2008 ACS, and thus could not be utilized in prior research on the factors associated with naturalization. In all of these studies, the dependent variable is simply a binary indicator for whether the respondent had naturalized by the time of the survey. In this chapter, I utilize information on the exact timing, and thus can assess how the probability of naturalization within, say, 5 or 10 years, varies with certain factors.

The focus in this chapter, as in chapter 1, is on educational attainment, which has generally been found to be associated positively with naturalization (Bloemraad, 2002; Chiswick and Miller, 2009;

[57] Vink (2013) presents rates of naturalization in several European countries but there is no information available regarding the timing of naturalization. For example, approximately 80 percent of the foreign born population, after at least ten years of residence, had naturalized as of the date of the survey in the Netherlands and Sweden, 65 percent had naturalized in the UK, 50 percent had naturalized in France, and only 35 percent had naturalized in Germany and Switzerland (Leibig and Von Haaren, 2011). Chiswick and Miller (2009) show that about 46 percent of the foreign born adults had naturalized after at least three years of residence in the US, as of the date of the survey, based on the 2000 US Census data.

DeVoretz and Pivnenko, 2005; Fougere and Safi, 2008; Yang, 1994), although some studies do not show a significant relationship (DeVoretz, 2008; Dronkers and Vink, 2012; Evans, 1988; Portes and Curtis. 1987; Zimmerman et al, 2009). In the first chapter of this thesis, I introduce an additional dimension of interest: completing higher education in the United States, and find that completing some college or an undergraduate degree in the US, as opposed to completing in the country of origin, is associated with a 2-3 percentage point increase in the probability of naturalization by the survey date. While this result is informative, being able to assess probabilities by specific durations provides additional useful information. In a hazard model, I find that the estimated fifth-year probability of naturalization for a typical male individual is 0.19 if he completed some college in the country of origin and it is 0.21 if he completed it in the US; the corresponding figures for women are 0.23 and 0.24.

This is a brief outline. The following section develops the theoretical framework that helps understand the role of US education in the naturalization decision. The next sections discuss the estimation methods used in the analysis and describe the data with respect to the timing of naturalization as well as the Cox-regression and alternative specification results. The paper closes with a summary.

2. Conceptual Framework

Acquiring higher education in the United States likely affects both the costs and the benefits of naturalization. The social capital accumulated by attending college in the US increases one's network of friends and commitment to the country. This likely reduces the implicit cost of giving up former citizenship and provides a further incentive to naturalize. Studying in the United States implies English fluency, which would reduce the cost of naturalization. First, it is easier to learn the required material and pass the civic exam at the naturalization interview. Second, the ability to speak English also makes it easier for the foreign born individual to obtain the necessary information regarding the naturalization

process. S/he can complete and file the application forms and forgo the paid services of a lawyer. There may also be resources available at the university to help the foreign born students navigate the naturalization process, which would reduce the costs further.

Completing college in the US possibly provides one with a larger employment network. If the US specific human capital aids the student in finding employment that offers sponsorship, it may further decrease the costs of naturalization. Large companies often handle the process at no cost to the employee. Completing higher education in the US also implies better knowledge of the system and it may increase the benefit to the naturalized in the form of higher wages. Furthermore, certain federal government jobs are only available to citizens and some of them require college education. It is likely that US degree would be more applicable and thus preferred, increasing the benefit of naturalization for the foreign born who completed their studies in the US.

The foreign born who gain permanent residency are required to live in the United States for five years to be eligible for citizenship via naturalization. The residency requirement is shortened to three years for individuals who served in the US military[58] or are married to a US citizen. The ACS lacks information on whether the foreign born individuals are permanent residents and thus eligible for naturalization. The data set only indicates whether they are naturalized citizens or noncitizens. Noncitizens include permanent residents, persons with temporary visas, and also those who are undocumented. The subcategories are not identified separately. However, in order to be eligible for naturalization, one must first be a legal permanent resident and have lived in the United States for a minimum of three years. Without an adjustment to their status, persons who enter the United States illegally or with a nonimmigrant visa (intended for temporary stays) are not eligible for naturalization.

[58] By Executive Order Number 13269, dated July 3, 2002, President Bush waived the waiting time for active military. Military personnel serving honorably in active-duty status at any time on or after September 11, 2001 until a date to be announced are eligible to apply for naturalization, regardless of how long they have been a resident. The residency requirement for inactive military members who served and were honorably discharged was reduced from three to one year in 2002 by Congress (USCIS, 2014). To reflect this change, the beginning of eligibility for all individuals who served in the military and became naturalized in 2002 or later is readjusted.

According to the U.S. Department of Homeland Security (2011), the majority of undocumented immigrants come from Mexico (more than 10 times compared to other countries).

The Census data predominantly used in the existing literature also do not include information on visa status and eligibility. Given this limitation, which I share with the previous research, the beginning of eligibility is best approximated by the residency requirement for naturalization (Chiswick and Miller, 2009). I assume that the foreign born are permanent residents upon arrival and the assumed eligibility for naturalization thus begins three or five years later. I recognize that this is the earliest that eligibility could begin. The foreign born who are not permanent residents upon arrival may become eligible at a later date via employment sponsorship or via marriage, or they may never become eligible. As a further complication to the naturalization research, the data on the timing of naturalization were not readily available to researchers prior to the 2008 ACS. The limiting lack of information on the timing of naturalization is overcome in this study. I use the 2008-2010 ACS PUMS data which include the year of naturalization.

While the beginning of eligibility is still approximated in this study, the information on the year of naturalization in the data presents a unique opportunity to enrich the citizenship literature. Knowing when naturalization occurred allows for a more precise estimation of the associations between the observed characteristics and naturalization and provides a novel insight into the timing of naturalization.

3. Methods

The timing of naturalization has not been studied in the citizenship literature due to data limitations. In other areas (e.g., marriage, parenthood, divorce) two main types of models have been used. The first consists of logit/probit models where the probability of an event happening by a certain point in time (e.g., divorce within 5 years of marriage) is specified as a function of a vector of

explanatory variables (e.g. Becker et al., 1977; Axinn et al., 1992; and Brien et al., 2006). The obvious disadvantage of these logit/probit models is the arbitrary choice of point in time, with the exact timing of the event (e.g., date of divorce) not being utilized.

The second main approach involves hazards models. Such models have been utilized in economics to study factors associated with the probability and timing of marriage dissolution (Lehrer, 1988, 2008, 2013), birth spacing (Miller et al., 1992), timing of first birth (Adsera, 2005), and work absence spells (Johansson and Palme, 2005), among others. Tuma and Michael (1985) study the entry into marriage and parenthood and estimate their models using OLS, logit and Cox proportional hazards models, and their 1986 paper compares the different estimation methods. While they find that all models yield reasonably similar estimates of the effects of covariates on the probability of ever marrying or ever having a child, the Cox proportional hazards model is found to be superior in predicting the patterns by age.

Survival analysis models factors associated with the time to the occurrence of an event. The event of interest in this study is becoming a citizen of the United States by naturalization. In this framework, T is the time from the onset of risk (assumed year of eligibility) to failure (naturalization). Defining the starting point – the onset of risk – is important. The model is estimated using the best approximation of the beginning of eligibility: five years after arrival or three years for those who are married to a US citizen or have served in the US military. The individuals who have not naturalized by the time of the survey are treated as censored, as naturalization may occur after the survey. Such event histories are said to be right-censored as of the survey year.

Since time plays such an important role in survival models, the analysis is focused on the functions that characterize the distribution of the survival time such as the hazard and survivor functions.

The hazard function, [59] *h(t)* is the instantaneous rate of failure (naturalization) conditional on survival to time t:

$$h(t) = \lim_{\Delta t \to 0} \frac{\Pr(t+\Delta t > T > t | T > t)}{\Delta t} \qquad \text{Eq.5}$$

The hazard rate equals 0 in the absence of risk and equals infinity when failure at that instant is certain. It is not constant over time. The probability of survival past a certain time corresponds to a given amount of risk accumulated up to that time. The hazard function measures the rate at which risk is accumulated. If the risk is falling with time, the hazard also falls. [60]

There are several different survival models. The Cox proportional hazard model, utilized in this study, has been widely used in the literature because it assumes no specific parametrization of the baseline hazard function over time, it is considerably more flexible compared to models that assume a particular probability distribution to represent survival times, and the partial likelihood estimates are consistent and asymptotically normal. In addition, although the model assumes proportional hazards (i.e., that the ratio of the hazard for an individual with covariates z_1 to that for an individual with covariates z_2 does not depend on time), the estimates provided by this model are useful even if the assumption is violated. In that case, the Cox estimates can be interpreted as the average effect over the range of times.

The risk of naturalization is allowed to vary with time and with the control variables. In the Cox proportional regression model the hazard is expressed as follows:

[59] The hazard function is sometimes referred to as the intensity function, conditional failure rate, or the age-specific failure rate.

[60] For example, among transplant patients the risk of death is high immediately after surgery, decreases for a few months and then increases when the body could possibly reject the transplanted organ. The hazard is therefore falling at first, is low and flat for a few months and then rises up again (Crowley and Hu, 1977; Thabut et al, 2008; Tsujitani and Tanaka, 2013). Human life has a similar pattern referred to as the "bathtub hazard".

$$h(t|\boldsymbol{x}_j) = h_0(t)\exp(\boldsymbol{x}_j\boldsymbol{\beta}_x) \quad \text{Eq.6}$$

The hazard ratios reported in the results section indicate the proportional shift in the baseline hazard function (h_0) associated with a unit change in the x variable:

$$\frac{h(t|x_1, x_2+1, \ldots, x_k)}{h(t|x_1, x_2, \ldots, x_k)} = \frac{h_0(t)\exp(\beta_1 x_1+\beta_2(x_2+1)+\cdots+\beta_k x_k)}{h_0(t)\exp(\beta_1 x_1+\beta_2 x_2+\cdots+\beta_k x_k)} = \exp\beta_2 \quad \text{Eq.7}$$

The survivor function reports the probability of surviving beyond time *t*, in other words the probability that one does not become naturalized prior to *t*. The survivor function is equal to 1 at *t*=0 and approaches 0 as *t* goes to infinity. The survivor function in the Cox model is:

$$F(t|\boldsymbol{x}_j) = (F_0(\mathrm{t}))^{\exp(\boldsymbol{x}\boldsymbol{\beta}_x)}, \text{ where} \quad \text{Eq.8}$$

$$F_0(\mathrm{t}) = \exp\left\{-\int_0^t h_0(u)du\right\} \quad \text{Eq.9}$$

The survivor function is of central importance in medical literature that utilizes hazard models as their main interest is survival past time t. In this study, I am interested in the "failure", in other words becoming a citizen of the US via naturalization. Therefore, I evaluate the complement of the survivor function ($1 - F(t)$) at specific values of the explanatory variables to obtain estimates of the magnitude of the associations between naturalization and completing higher education in the US at specific durations.

4. Data

I use the American Community Survey 2008-2010 PUMS. The data provide information on the basic demographic and socioeconomic variables. In the ACS, as was true for the Census, the legal status

and visa type are unknown. The data are cross-sectional and immigrants who have left the country or who may intend to leave the country in the future cannot be identified. However, as of 2008, the ACS reports the year of naturalization and is therefore an improvement over the Census data used in previous studies.[61] The basic descriptive statistics of the data are presented in the first chapter of this thesis. The data section of this chapter focuses on describing the distributions of survival time.

Survival time is the interval from the beginning of eligibility until year of naturalization or year of the survey (censoring). The onset of risk marks the beginning of the interval. Based on the previous literature, the beginning of eligibility is best approximated by the five, or three, year residency requirement for naturalization. However, permanent residents may apply for naturalization 90 days prior to the fifth or third anniversary, as long as all other eligibility criteria are met at the time of filing (USCIS, 2014). A foreign born individual could therefore become naturalized shortly before the fifth (third) anniversary. Since the data report only the year of naturalization, this permits the possibility of naturalization occurring only four (two) calendar years after arrival.[62] If naturalization is recorded to have occurred prior to or in the same year as the onset of risk, the observation must be excluded from the empirical analysis. In order to prevent the exclusion of these observations, the beginning of eligibility is adjusted to four, or two, years after arrival.

Additionally, citizenship status of former spouses is not observed. However, a former spouse could have been a citizen, thus allowing for naturalization after three years of residency. Therefore, if the individual is currently not married and the last marriage occurred prior to naturalization, or if the

[61] Jasso and Rosenzweig (1986) use INS data and have information on visa status. Most of the remaining literature uses publicly available data such as the Census.

[62] For example, a foreign born individual who came to the US on an immigrant visa on January 3rd, 1990 would have met the residency requirement on January 3rd, 1995. However, given the early filing option, s/he could have naturalized on December 26th, 1994. Naturalization would thus occur in 4 calendar years. Confirmed via telephone April 4/14/2014 – USCIS National Customer Service Center (1-800-375-5283).

individual has been married multiple times, the onset of risk is based on the three year residency requirement. [63]

For 3,846 individuals, naturalization is reported to have occurred in the first year following arrival (representing less than 1 percent of the sample). These observations were excluded from the data. Possible explanations include recall error of the respondents or data entry errors. Furthermore, according to the United States Citizenship and Immigration Services (USCIS, 2014) if a person is "engaged in certain kinds of overseas employment, [64] [s/he] may be eligible for an exception to the continuous residence requirement." It is also possible that the reported year of entry is not the first entry to the US and therefore eligibility may have begun earlier (Lubotsky, 2007[65]).

The sample used in the analysis is restricted to include only foreign born respondents whose parents were not US citizens. Furthermore, they arrived as adults, were not naturalized prior to arrival to the US, are between the ages of 25 and 64 at the time of the survey, have met the residency requirement, and did not naturalize prior to the assumed eligibility year. The sample consists of 442,250 foreign born (232,856 women and 209,394 men). The average time from eligibility to naturalization among individuals who became naturalized by the survey date is 8.89 years. I also create a subsample which is restricted to the non-Mexican foreign born. The literature has identified immigrants from Mexico as the most likely to be undocumented; this restriction should therefore minimize potential biases from including ineligible individuals. The sample that excludes Mexican respondents consists of 321,524

[63] This adjustment resulted in earlier eligibility for 1,184 observations of the 446,096, which is approximately one quarter of a percent.

[64] The employment categories include: United States government, including the military; contractors of the United States government; a recognized American institution of research; a public international organization; an organization designated under the International Immunities Act.

[65] Lubotsky (2007) uses data from the Social Security office and the INS and shows that the year of arrival reported is often not the first entry to the US.

observations (147,929 men and 173,595 women). The average time to naturalization in the sample that excludes individuals from Mexico is 8.25 years – slightly shorter than the mean of the full sample.

5. Examining the Hypotheses on the Timing of Naturalization

The survivor function (Cox proportional hazard with no controls) represents the probability that there is no naturalization prior to time t. Table XII presents the complement of the survivor function – the probability of naturalization by time t, evaluated at specified intervals from the assumed eligibility (1 year, 6 years, 11 years, etc.). The first-year probability of naturalization is 0.01, the sixth-year and eleventh-year probabilities of naturalization increase to 0.22 and 0.39 respectively. A relatively sharp increase in the estimated probability of naturalization is observed. The probability of naturalization increases by approximately twenty percentage points (pp) in the first two 5-year periods. The sixteenth-year probability is 0.52 (an increase of 13 pp) and the twenty-first-year probability is 0.62 (an increase of 10 pp). The incremental increases in the probability of naturalization for each five-year period decrease with time.

TABLE XII: THE PROBABILITY OF NATURALIZATION BY TIME t

t Years since eligibility	$1 - F(t)$ Probability of naturalization by time t	
	Full Sample	Excludes Mexico
1	0.01	0.02
6	0.22	0.29
11	0.39	0.49
16	0.52	0.63
21	0.62	0.72
26	0.70	0.79
31	0.76	0.84
36	0.81	0.87
41	0.84	0.89
46	0.86	0.91
N=	442,250	321,524

This pattern is consistent with the theoretical predictions stated in the previous literature that the foreign born who are eligible for citizenship would choose to pursue naturalization early on in order to enjoy the benefits. This pattern is even more pronounced in the sample that excludes Mexican respondents. The increases in the probability of naturalization associated with each five year period are 27 pp (0.29 - 0.02), 20 pp, 14 pp, 9 pp, 7 pp, 5 pp, and 2 pp.

The complements of the survival functions presented in Table XIII show that foreign born individuals with higher educational attainment have a higher probability of ever becoming naturalized. This point can be seen in the bottom row of Table XIII, which displays the probability of naturalization by the 41st year since eligibility. The estimates show that the higher the educational attainment, the higher the probability of naturalization by that time. The predicted 41-year probability of naturalization is 0.73 for individuals with less than high school education, 0.83 for high school graduates, 0.89 for individuals who completed some college, 0.93 for undergraduate degree holders, and 0.94 for persons with a graduate degree.

TABLE XIII: THE PROBABILITY OF NATURALIZATION BY TIME t (BY EDUCATIONAL ATTAINMENT)

t Years since eligibility	$1 - F(t)$ Probability of naturalization by time t									
	Full Sample					Excludes Mexico				
	Less than HS	High School	Some College	Under graduate	Graduate	Less than HS	High School	Some College	Under graduate	Graduate
1	0.01	0.02	0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.01
6	0.11	0.21	0.30	0.34	0.25	0.21	0.28	0.34	0.35	0.26
11	0.21	0.37	0.49	0.57	0.54	0.35	0.45	0.53	0.59	0.55
16	0.32	0.50	0.63	0.70	0.72	0.49	0.58	0.67	0.72	0.72
21	0.42	0.60	0.72	0.79	0.80	0.59	0.68	0.75	0.80	0.81
26	0.52	0.69	0.78	0.84	0.86	0.68	0.75	0.81	0.85	0.87
31	0.60	0.76	0.83	0.88	0.90	0.75	0.80	0.85	0.89	0.90
36	0.68	0.81	0.86	0.91	0.93	0.80	0.84	0.88	0.92	0.93
41	0.73	0.83	0.89	0.93	0.94	0.83	0.85	0.90	0.93	0.94
N=	145,384	79,560	80,340	75,709	61,257	64,965	57,323	68,818	71,025	59,393

The estimated probabilities for the sample excluding Mexican respondents are larger in magnitude, with the difference being more pronounced among those with lower levels of education. For example the sixteenth-year predicted probability of naturalization among individuals with less than high school education is 0.32 for the full sample and 0.49 for the sample excluding Mexico. This descriptive result is consistent with Mexican foreign born individuals being less educated and undocumented and also more likely to return to Mexico. The 41st-year probability is 0.73 for the full sample and 0.83 for the sample excluding Mexico. This is only a 10 pp difference compared to 17 pp difference at 16 years of eligibility. The higher propensity to return migration due to the geographic proximity would explain why the difference in the probability compared to the full sample becomes smaller over time, as some of the undocumented individuals may have returned to Mexico. Moreover, the undocumented individuals may have eventually found a pathway to permanent residency and consequently naturalization.

6. Cox Regression Analyses

This section discusses results from multivariate Cox proportional hazards regressions, estimated separately for males and females. The model controls for all the relevant, observed factors specified in the first chapter and is estimated using two samples. The first sample includes all the foreign born; the second sample excludes the foreign born from Mexico to minimize the potential bias of including undocumented individuals who are ineligible for naturalization.

The associations between completing higher education in the US and naturalization can be assessed from Table XIV. The table reports the regression coefficients with standard errors in parentheses and the hazard ratios. Furthermore, the fifth-year estimated probabilities of naturalization for each educational category are reported. They are calculated as the complement of the survivor function evaluated at five years from the assumed date of eligibility, controlling for the vector of

covariates. These estimated probabilities correspond to the typical individual: all continuous controls are set at the mean and the categorical controls are set at the mode.

TABLE XIV: COX PROPORTIONAL HAZARDS MODELS OF NATURALIZATION

Educational category (reference: less than HS)	High school	Some college in origin	Some college in US	Under-Graduate in origin	Under-graduate in US	Graduate in origin	Graduate in US
MALE (n=209,394)							
Coefficient	0.4214***	0.6762***	0.7618***	0.7122***	0.7980***	0.6373***	0.6015***
Standard error	(0.0112)	(0.0116)	(0.0220)	(0.0125)	(0.0215)	(0.0123)	(0.0173)
Hazard ratio	1.52***	1.97***	2.14***	2.04***	2.22***	1.89***	1.82***
Hazard ratio – (US relative to origin) [a]			1.09***		1.09***		0.96*
5th year probability[b]	0.15	0.19	0.21	0.20	0.21	0.18	0.18
MALE - excludes Mexico (n=147,929)							
Coefficient	0.3272***	0.5520***	0.6300***	0.5739***	0.6530***	0.4927***	0.4491***
Standard error	(0.0129)	(0.0126)	(0.0238)	(0.0131)	(0.0217)	(0.0129)	(0.0174)
Hazard ratio	1.39***	1.74***	1.88***	1.78***	1.92***	1.64***	1.57***
Hazard ratio – (US relative to origin) [a]			1.08***		1.08***		0.96**
5th year probability[b]	0.22	0.27	0.28	0.27	0.29	0.25	0.24
FEMALE (n=232,856)							
Coefficient	0.4370***	0.7181***	0.7702***	0.7451***	0.8110***	0.6622***	0.6605***
Standard error	(0.0098)	(0.0099)	(0.0201)	(0.0107)	(0.0198)	(0.0119)	(0.0185)
Hazard ratio	1.55***	2.05***	2.16***	2.11***	2.25***	1.94***	1.94***
Hazard ratio – (US relative to origin) [a]			1.05**		1.07***		1.00
5th year probability[b]	0.18	0.23	0.24	0.23	0.25	0.22	0.22
FEMALE - excludes Mexico (n=173,595)							
Coefficient	0.3268***	0.5589***	0.5993***	0.5881***	0.6451***	0.4986***	0.4981***
Standard error	(0.0108)	(0.0105)	(0.0209)	(0.0110)	(0.0198)	(0.0120)	(0.0182)
Hazard ratio	1.39***	1.75***	1.82***	1.80***	1.91***	1.65***	1.65***
Hazard ratio – (US relative to origin) [a]			1.04*		1.06**		1.00
5th year probability[b]	0.24	0.30	0.31	0.30	0.32	0.28	0.28

Standard errors in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Model controls for personal characteristics, characteristics of the US region of residence and characteristics of the country of origin. For complete list, see Chapter 1 of this thesis. Educational categories are binary, mutually exclusive and collectively exhaustive, with reference category of less than high school education.

[a] Model is estimated using Some college in origin as the omitted category instead of Less than high school. The hazard ratio reported in the table represents the increase in the hazard of naturalization for individuals who completed some college in the US relative to their otherwise comparable counterparts who completed it in the country of origin. The method is repeated with Undergraduate and Graduate education in origin as omitted categories. Identical results are obtained using a model with US education interaction terms.

[b] Probabilities are calculated as the complement of the estimated survivor function evaluated at a specific year since eligibility. Results in each case are reported for a representative individual (continuous controls set at the mean and dichotomous controls set at the mode). Across columns, the probabilities are evaluated at different levels of education.

The hazard ratios are presented in Table XIV to assess the overall association between completing higher education in the US and naturalization. The educational categories are mutually exclusive and collectively exhaustive. Relative to the reference category (less than high school

education) and controlling for the vector of observable characteristics, men who completed some college in the country of origin have 1.97 times the odds of naturalization (2.05 times for women). Moreover, men who completed some college in the US have 2.14 the odds of naturalization (2.16 times for women). Among undergraduate degree holders who completed their education in the country of origin the odds are 2.04 times higher for men (2.11 times for women). US completion of an undergraduate degree raises the odds 2.22 times for men (2.25 times for women), relative to otherwise comparable individuals with less than high school education. Men with graduate degrees from their country of origin have 1.89 times the odds of naturalization and women have 1.94 times the odds. The corresponding figures for their counterparts with US degrees are 1.82 and 1.94.

In order to assess the significance of the differences in the likelihood of naturalization by the location of completing higher education, the model is re-estimated using alternative specifications. First, the model is estimated with *Some college in origin* as the omitted educational category instead of *Less than high school*. Therefore, the hazard ratio associated with *Some college in the US* represents the increase in the hazard of naturalization relative to otherwise comparable individuals who completed some college education in the origin. Identical method is then used for undergraduate and graduate education. Thus the Hazard ratio (US relative to origin) reported in Table XIV represent the increase in the hazard associated with US completion for a given level of education. The hazard of naturalization for men who completed some college or an undergraduate degree in the US is approximately 1.09 times the hazard of their counterparts who completed some college in the country of origin, controlling for other covariates. Women's hazard associated with completing some college or an undergraduate degree in the US is 1.05 times and 1.07 times the hazard of women who completed their degrees in the country of origin, respectively. These differences are all significant at the 1% level.

Completing a graduate degree in the US, relative to completing it in the country of origin, is associated with a small reduction in the hazard of becoming naturalized among men (hazard ratio=0.96,

p=0.05). Attending graduate school in the US may delay naturalization until the completion of the degree. Also, individuals who completed their degrees in the country of origin may have received sponsorship offers prior to arrival, expediting naturalization. Completion of a graduate degree in the US is not associated with a significant change in the hazard of naturalization among women. [66]

The hazard ratios associated with the various levels of higher educational attainment which were estimated using the sample excluding Mexico are of slightly smaller magnitude, as presented in the bottom panel of the male and female results of Table XIV. However, assessing the significance of the differences in the likelihood of naturalization by the location of completing higher education from the model with interaction terms presents comparable results. The increase in the hazard of naturalization associated with completing some college in the US (1.08 times for men, 1.04 times for women) and undergraduate degrees in the US (1.08 times for men, 1.06 times for women), relative to their counterparts who completed it in the country of origin, remains positive, significant and of similar magnitude as in the main specification.

The estimated probabilities of naturalization at five years since eligibility provide a way to assess the absolute magnitude of the associations. Table XIV shows that for men who completed some college, the predicted fifth-year probability of naturalization is 0.21 if they did so in the US, compared to 0.19 for their counterparts who did so in the country of origin, a difference of 2 pp. The fifth-year probability of naturalization for men with undergraduate degrees is 0.21 if they completed it in the US, compared to 0.20 for men who completed their degree in the country of origin, a difference of 1 pp. Among college educated women, the predicted probabilities of naturalization are slightly higher. The estimated fifth-year probability of naturalization for women with some college education is 0.24 if education was completed in the US, compared to 0.23 for women who completed the degree in the country of origin, a

[66] The negative association between US completion of a graduate degree and naturalization found for men and the lack of association found for women may be explained by the delayed pattern. Furthermore, possible measurement errors associated with US completion would lead to underestimation of the association between US completion and naturalization, as discussed in the first chapter of this thesis.

difference of 1 pp. The fifth-year probability for women who completed their undergraduate degree in the US is 0.25, compared to 0.23 for their counterparts who completed their degrees in the country of origin, a difference of 2 pp. These results, compared to those in the earlier literature which focus on the effects on the probability of naturalization by the survey date, offer a clearer interpretation.

Each of the probabilities estimated using the sample excluding Mexico is higher than the counterpart in the full sample. The result is consistent with the theoretical prediction of Mexican immigrants being more likely to be undocumented and therefore ineligible for naturalization, regardless of their educational attainment. Nevertheless, the pattern of increase in the predicted probability of naturalization associated with US education is quantitatively similar in the full and restricted samples.

7. Alternative Specifications

Results from static logit estimation are presented in Table XV, as a robustness check. The dependent variable in this specification is a binary indicator of whether an individual naturalized by the fifth year of eligibility. The results from the logit models are generally consistent with the Cox results reported earlier in both direction and significance. The logit models do not take advantage of the exact information on timing, as the Cox models do, and may result in less precise estimates. For example, when the logit model is estimated with a dependent variable of naturalization within 3 years of eligibility, it fails to recognize the significant increase in the odds of naturalization associated with completion of higher education in the US among men. [67]

[67] In future research, I will conduct additional robustness checks (e.g., using some of the parametric specifications within the family of hazards models). I will also conduct stratification analyses by region to allow the speed of naturalization to differ by region of origin.

TABLE XV: LOGIT MODEL OF NATURALIZATION BY 5 YEARS OF ELIGIBILITY

Dependent variable		High school	Some college in origin	Some college in US	Under-Graduate in origin	Under-graduate in US	Graduate in origin	Graduate in US
MALE (n=209,394)								
Naturalized by 5 years	Coefficient	0.5890***	0.9047***	1.0581***	0.8161***	1.0212***	0.3717***	0.1996***
	Standard error	(0.0214)	(0.0216)	(0.0418)	(0.0232)	(0.0421)	(0.0246)	(0.0418)
	Odds ratio	1.80***	2.47***	2.88***	2.26***	2.78***	1.45***	1.22***
	Odds ratio (US relative to origin)[a]			1.17***		1.23***		0.84***
5th year probability[b]		0.16	0.20	0.23	0.19	0.22	0.13	0.11
FEMALE (n=232,856)								
Naturalized by 5 years	Coefficient	0.5980***	0.9020***	1.1294***	0.8126***	1.0704***	0.4539***	0.4349***
	Standard error	(0.0185)	(0.0186)	(0.0369)	(0.0198)	(0.0377)	(0.0234)	(0.0407)
	Odds ratio	1.82***	2.46***	3.09***	2.25***	2.92***	1.57***	1.54***
	Odds ratio (US relative to origin)[a]			1.26***		1.29***		0.98
5th year probability[b]		0.18	0.23	0.27	0.21	0.26	0.16	0.16

Standard errors in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
Model controls for personal characteristics, characteristics of the US region of residence and characteristics of the country of origin. For complete list, see Chapter 1 of this thesis. Educational categories are binary, mutually exclusive and collectively exhaustive with reference category of less than high school education.

[a] Model is estimated using Some college in origin as the omitted category instead of Less than high school. The odds ratio reported for Some college in US represents the increase in odds of naturalization for individuals who completed some college in the US relative to their otherwise comparable counterparts who completed it in the country of origin. The method is repeated with Undergraduate and Origin in origin as omitted categories.

[b] Probabilities are calculated for a representative individual (continuous controls set at the mean and dichotomous controls set at the mode). Across columns, the probabilities are evaluated at different levels of education.

8. Conclusions and Directions for Further Research

The literature has not explored the topic of becoming a US citizen via naturalization as intensively as other forms of immigrant assimilation, such as earnings. Moreover, the timing of naturalization has never been analyzed. One of the major obstacles to this research has been the lack of adequate data, and the 2008 wave of the American Community Survey presents a unique opportunity for researchers. The data set includes several new variables of interest, the year of naturalization in particular. In this chapter, I make two contributions to the literature. First, I evaluate the patterns of timing of naturalization. Second, I improve the methodology used to date, including the first two chapters of this dissertation, by utilizing the new information on the timing of naturalization in a hazard analysis.

The previous literature has hypothesized that the foreign born individuals who are eligible for citizenship would choose to pursue naturalization early on in order to enjoy the benefits. I test this hypothesis using the newly available information on the timing of naturalization and find that the probability of naturalization does indeed increase the fastest during the first decade after satisfying the residency requirement. Thereafter, the probability of naturalization continues to rise with time but at a slower rate. The probability of naturalization increases by approximately 20 pp in the first two 5-year periods. The subsequent 5-year periods are associated with an increase of 13 pp and an increase of 10 pp in the probability of naturalization. The pattern is even more pronounced in the sample that excludes Mexican respondents. The increases in the probability of naturalization associated with each five year period are 27 pp, 20 pp, 14 pp, 9 pp, 7 pp, 5 pp, and 2 pp. The incremental increases in the probability of naturalization for each five-year period decrease with time, in support of the theoretical predictions stated in the previous literature.

Chapter 1 provides evidence that completing higher education in the US strengthens the association with naturalization. Taking advantage of the richer data, I explore this association further in this chapter using the Cox proportional hazards model, which utilizes the new information on the timing of naturalization. Acquiring higher education in the United States is expected to affect naturalization. The social capital accumulated by attending college in the US increases one's network of friends and resources, potential employment network, and commitment to the country. Studying in the United States implies English fluency and thus easier access to information regarding naturalization. The US specific human capital acquired by attending college also signals better knowledge of the US markets and may aid the student in finding employment that offers sponsorship. Naturalized citizens may be rewarded by higher wages and certain federal government jobs are only available to citizens. It is likely that a degree completed in the US would be more applicable and thus preferred, increasing the benefit of naturalization for the foreign born individuals who completed their studies in the US. However, the

identification is challenging as individuals who desire to live in the US may also be more likely to study English and to obtain higher education in the US. Furthermore, other unobserved factors such as discount rates and family preferences may impact both US education and naturalization. Therefore, the coefficients associated with US education may also capture such factors.

I evaluate the role of US education in the timing of naturalization by estimating a Cox-regression, focusing on the complement of the survival function. The estimated probabilities of naturalization for the representative individual evaluated at five years of eligibility are higher for foreign born individuals who completed some college or an undergraduate degree in the US, relative to their otherwise comparable counterparts who completed their studies in the country of origin. I find that the estimated probability of naturalization at five years since eligibility is 0.20 for men who completed an undergraduate degree in the country of origin, compared to 0.21 for men who completed their degree in the US. The corresponding figures for women are 0.23 and 0.25. Each of the probabilities estimated using the sample excluding Mexico is higher than the counterpart in the full sample. The result is consistent with the theoretical prediction of Mexican immigrants being more likely to be undocumented and therefore ineligible for naturalization, regardless of their educational attainment. Nevertheless, the pattern of increase in the predicted probability of naturalization associated with US education is quantitatively similar in the full and restricted samples. These findings are robust to the alternative logit specification.

Understanding the factors that are associated with the timing of naturalization may be beneficial in designing policies encouraging US citizenship and deserves full attention in future investigations. The literature review presented in the first chapter highlighted several areas with mixed results, where there is a need for further research with more precise estimates. The analyses presented in this chapter illustrate that hazards models may be used to improve the methodology employed in earlier work for the entire range of factors associated with the probability of naturalization. An important avenue for future

research would be to exploit the new information on timing available in the ACS data to improve the estimates of these associations.

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APPENDICES

Appendix A

TABLE XVI: DETERMINANTS OF NATURALIZATION

Variable (Predicted sign)	Hypothesis:
Personal Characteristics:	
Education (+)	Education is a form of investment in human capital which is often associated with higher ability. Educated immigrants will likely understand the benefits of naturalization, which may include higher earnings, and they will seek the information regarding eligibility for naturalization. They may also opt to complete the application and submit it without the need to hire an attorney, thus reducing the explicit cost of naturalization. Furthermore, those with higher education likely have more skills and may attract employer sponsorship. Therefore, the foreign born with higher educational attainment are expected to have a higher propensity to naturalize.
Education completed in the US (+)	If education was completed in the US, some components of this investment in human capital are likely to be country specific and English proficiency is implied. Therefore, the human capital stock of those who completed their highest level of education in the US would likely be valued more highly by potential employers. This may be expressed by sponsorship offers, providing a pathway to citizenship. The US specific human capital may warrant higher compensation which would provide an incentive to naturalize in order to be eligible to apply for more jobs. Furthermore, completing higher education in the US not only provides one with an employment network, it also implies that the potential marriage market for those foreign born will be different, as many relationships and networking connections are made in college. Completing the highest level of education in the US is expected to result in higher likelihood of naturalization.
Gender	The current study estimates the model separately by gender, as several studies show that the impact of determinants differs by gender (Chiswick and Miller, 2009; DeSipio, 1987; Fougere and Safi; 2008; Jasso and Rosenzweig, 1986; Zimmermann et al., 2009).
Age at arrival (+)	Likely the older the person was at migration, the more committed s/he might be to the host country and thus be more likely to naturalize. [68]
Years since migration YSM (+)	Years since migration directly affect one's ability to naturalize based on the residency requirements. Furthermore, the longer one stays in the host country, the more human, social and physical capital one accumulates and would be less likely to give it up. The probability of naturalization is expected to be higher for those who have been in the United States longer.
YSM^2 (-)	Naturalization is expected to be taken up shortly after the person becomes eligible and a squared term for years since migration is also included (Chiswick and Miller, 2009; Yang, 1994; Jasso and Rosenzweig, 1986).
Speaks language other than English at home (-)	Previously utilized by Chiswick and Miller (2009). It is not intended to measure the ability to speak English, which is endogenous. [69] This variable might be indicative of the affinity to the country of origin and is likely associated with the age at migration and also whether one lives with family members. If other language is spoken at home, the immigrant might have stronger ties to the country or origin and be less likely to desire US citizenship and is thus expected to be less likely to naturalize.
Abroad (-)	The residency requirement for citizenship imposes limitations on the amount of time one may live abroad. Therefore, those who lived abroad a year prior to the survey are likely less committed to the US and may also face a prolonged waiting period due to ineligibility to naturalize. The expected association between living abroad and the propensity to naturalize is negative.

[68] Several studies include age and age squared for nonlinear relationship. The current study estimates the model with age and age squared, resulting in no significant changes in the remaining coefficients. Age is found to have a positive impact on naturalization, as in most of the literature and the age squared term is very small in magnitude though negative, suggesting decreasing rate. DeVoretz (2008) explains the decreasing rate using the human capital approach: with greater lifetime benefits to accrue from naturalization, the more likely to naturalize earlier.

[69] English fluency, or the ability to speak English, is also a factor in the naturalization process, as it signals integration and improves the chances of passing the citizenship exam in the US. However, given that English fluency is observed at the time of survey, the direction of causality is not clear and it may be endogenous. Naturalized citizens might be speaking better English because they had to learn it to pass the citizenship exam, or they may have had more practice and access to English speakers on the job because they are citizens, resulting in an endogenous relationship. Therefore English fluency is not included in the multivariate analysis, but the positive relationship is highlighted in the data chapter via cross-tabulations.

Military (+)	Serving in the US military is associated with a strong level of commitment to the host country. In addition, the residency requirement is also shortened which reduces the cost of naturalization. Therefore, serving in the military, as a proxy for commitment to the US, is expected to be positively associated with naturalization. [70]
Category of household: non-family (omitted), lives alone (+), family (+)	Another proxy for commitment, responsibility, and ties to the community is the category of household (Chiswick and Miller, 2009). The categories include family (married couple or single headed household), non-family (omitted), and living alone. Living with roommates is not likely to increase ties to the community. Single member households are likely less committed than a family household, but more likely than a non-family household. Compared to a non-family household the probability to naturalize is expected to be higher. Family households are less likely to return to the country of origin and are thus expected to have a positive association with naturalization.
Married (+)	Married is also included and interacted with the family indicator in order to differentiate single headed households from married couple households. Marriage is a pathway to citizenship. Foreign born without permanent residency who marries a US citizen or permanent resident is eligible for status adjustment, even if they were in the country illegally. With appropriate administrative action which is more expedient if the spouse is a citizen, the immigrant can become a permanent resident and later get naturalized.
US region Characteristics:	
Urban (?)	Urban areas might provide easier access to information and outreach centers, immigration offices, lawyers, or English classes which would create an incentive for naturalization. On the other hand, in a dense urban area jobs may be easier to find compared to a non-metro area, regardless of citizenship status. Outside of the city, employers may be hesitant to hire a noncitizen, especially if unfamiliar with the legal process or ramifications, thus providing an incentive to naturalize for those living in a non-urban area. The expected direction of the relationship is ambiguous.
South (-)	An indicator for the South in the US has also been used in the literature, though Chiswick and Miller (2009) did not find it significant. Aside from a different climate and possible differences in labor laws, the important consideration is which immigrants live in the South. It is likely, due to the proximity to Mexico, that there are more Mexican immigrants living in the South. They may have stronger ties to the home country and may have a higher propensity to return migration. Also, there may be a disproportionate number of undocumented immigrants. A negative association with the propensity to naturalize is expected.
Ethnic enclave (?)	Ethnic enclave measures the percentage of immigrants from a given country of origin in the PUMA. The literature contains two competing hypotheses regarding ethnic enclaves. On the one hand, the larger the community from the same country of origin, the more "self-sufficient" in terms of finding jobs and housing it would be. Furthermore, the immigrants may maintain a stronger affinity with the country of origin and its culture and customs, making it less likely to want to become an American citizen. The likelihood or perceived need to naturalize might decrease as the size of the ethnic enclave increases. On the other hand, a larger community might increase access to information on how to naturalize, educate its members on the benefits of naturalization, and provide classes to prepare for the civic exam and learning English. This would increase the likelihood of naturalization in larger ethnic enclaves. The predicted sign is thus ambiguous.
Foreign enclave (?)	Foreign enclave measures the percentage of foreign born in the PUMA. The process of naturalization might be easier in a community with a lot of immigrants, as they might have more information and resources available to them. Therefore, the larger the foreign community, the more likely one is to naturalize. However, Fougere and Safi (2008) consider larger foreign presence a bigger burden on the administrative process of naturalization and empirically find a negative association. The direction of the impact on naturalization is ambiguous.

[70] Undocumented immigrants are not permitted to serve in the military, though there is some political pressure to extend the DREAM act to include military service as an option for illegal immigrants who came to the US as children. As the ACS does not indicate the legal status of noncitizens and therefore it is impossible to know whether the noncitizen is eligible to serve.

Country of Origin Characteristics:	
Sojourner index (-)	A sojourner index (Chiswick and Miller, 2009) is defined as the percentage of surveyed immigrants from the same country of origin who report living abroad 1 year prior to the survey. It approximates the propensity to return migrate for each country of origin, though at one specific point in time. The larger the sojourner index, the larger the propensity to return migration, the smaller the probability to naturalize in the US.
GDP (-)	GDP per capita is used to capture the average level of income, indicative of the standard of living in the country of origin. If conditions at home are good, the immigrant might be more likely to return. The higher the GDP per capita, the less likely the person is to naturalize and become a citizen.
Civil liberties: Low(+), M (omitted), High(-)	If people in the country of origin have limited civil liberties, the immigrant would likely not want to return and would have an incentive to become a US citizen by naturalization. Therefore, compared to those coming from countries with medium/average civil liberties, those from countries with low civil liberties are expected to be more likely to naturalize in the US.
Political rights: L(+), M (omitted), High(-)	If people in the country of origin have limited political rights, the immigrant would likely not want to return and would have an incentive to become a US citizen by naturalization. Therefore, compared to those coming from countries with medium/average political rights, those from countries with low political rights are expected to be more likely to naturalize in the US.
Geographic distance (+)	Geographic distance between the capital of the country of origin and the closest port in the United States indirectly represents the moving costs. The further away the country of origin is from the US, the larger the cost of moving back and the more likely one is to naturalize.
Linguistic distance (-)	Linguistic distance measures the difficulty of learning English, developed by Chiswick and Miller (2005). The more different the language of the country of origin is from English, the harder it will be to learn English and the less likely one is expected to naturalize.
Dual citizenship (+)	One of the costs of naturalization is the possibility of various losses in the country of origin. The forgone citizenship of the origin country may result in no access to the home country labor market, possible loss of the right to hold land, or higher taxes to pay on land; no entitlement to public services, such as subsidized education for children; and loss or limitations of social insurance benefits. However, if the country of origin does allow dual citizenship and the individual is allowed to remain a citizen, then the perceived costs decrease. Thus a positive association between dual citizenship and naturalization is expected.
English official language (+)	While the ability to speak English may be endogenous, whether the country of origin has English as an official language is exogenous. As knowledge of English is vital to passing the citizenship exam, the foreign born from countries with English as an official language will be more likely to naturalize.
Country of origin (Fixed Effect)	Immigrants from a given country may have unobservable characteristics that are specific to the country itself. For example, there may be specific immigration policies such as quotas that are relevant, the country of origin may have a strong trade relationship with the US increasing exposure and opportunity to come to the US, or based on historical events, there may be a certain sentiment toward immigration or the United States. This provides a compelling reason for a fixed effect model with a country of origin control.

Appendix B

TABLE XVII: MODELS OF CITIZENSHIP BY GENDER, PROBIT AME

	1	2	3	4
	Male	Male w/o Mexico	Female	Female w/o Mexico
High School	0.1028***	0.0944***	0.1078***	0.0894***
	(0.0026)	(0.0034)	(0.0025)	(0.0031)
Some college	0.1718***	0.1539***	0.1875***	0.1525***
	(0.0029)	(0.0034)	(0.0026)	(0.0030)
Some college*US	0.0270***	0.0348***	0.0324***	0.0360***
	(0.0066)	(0.0081)	(0.0064)	(0.0072)
Undergraduate	0.1728***	0.1486***	0.1957***	0.1600***
	(0.0032)	(0.0035)	(0.0027)	(0.0030)
Undergraduate*US	0.0467***	0.0514***	0.0427***	0.0444***
	(0.0069)	(0.0074)	(0.0065)	(0.0069)
Graduate	0.1547***	0.1301***	0.1706***	0.1345***
	(0.0032)	(0.0035)	(0.0032)	(0.0034)
Graduate*US	0.0060	0.0043	0.0069	0.0068
	(0.0053)	(0.0056)	(0.0061)	(0.0063)
Age at arrival	0.0037***	0.0031***	0.0025***	0.0016***
	(0.0001)	(0.0002)	(0.0001)	(0.0001)
Years since Migration	0.0449***	0.0513***	0.0444***	0.0510***
	(0.0004)	(0.0005)	(0.0004)	(0.0004)
Years since migration squared	-0.0006***	-0.0007***	-0.0006***	-0.0007***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Speaks another language at home	-0.0410***	-0.0290***	-0.0439***	-0.0343***
	(0.0036)	(0.0040)	(0.0034)	(0.0037)
Abroad	-0.0465***	-0.0373*	-0.0602***	-0.0601***
	(0.0132)	(0.0163)	(0.0136)	(0.0156)
Military	0.1299***	0.1320***	0.0975***	0.0961***
	(0.0071)	(0.0075)	(0.0124)	(0.0128)
Living alone	0.0420***	0.0411***	0.0450***	0.0463***
	(0.0057)	(0.0065)	(0.0064)	(0.0069)
Family	0.0864***	0.0981***	0.0646***	0.0766***
	(0.0044)	(0.0055)	(0.0053)	(0.0061)

US Region:				
PUMA is urban	-0.0257***	-0.0228***	-0.0232***	-0.0207***
	(0.0029)	(0.0038)	(0.0028)	(0.0035)
Lives in the South	-0.0051*	-0.0048*	-0.0114***	-0.0134***
	(0.0020)	(0.0024)	(0.0019)	(0.0023)
Ethnic enclave	-0.0031***	0.0011***	-0.0038***	0.0009***
	(0.0001)	(0.0002)	(0.0001)	(0.0002)
Foreign enclave	0.0012***	0.0001	0.0014***	0.0002***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Country of origin:				
Sojourner index	-0.0834***	-0.1074***	-0.0891***	-0.1191***
	(0.0057)	(0.0060)	(0.0055)	(0.0058)
GDP (thousands $)	-0.0044***	-0.0030***	-0.0067***	-0.0052***
	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Low civil liberties	0.0316***	0.0149**	0.0109*	-0.0038
	(0.0052)	(0.0054)	(0.0049)	(0.0050)
High civil liberties	0.0333***	0.0239***	0.0258***	0.0090*
	(0.0033)	(0.0041)	(0.0030)	(0.0038)
Low political rights	0.0507***	0.0301***	0.0817***	0.0568***
	(0.0050)	(0.0051)	(0.0047)	(0.0047)
High political rights	-0.0360***	-0.0620***	-0.0237***	-0.0457***
	(0.0027)	(0.0032)	(0.0024)	(0.0029)
Dual citizenship	0.0474***	0.0755***	0.0372***	0.0628***
	(0.0027)	(0.0029)	(0.0026)	(0.0028)
English official	0.0179***	0.0058	0.0302***	0.0180***
	(0.0030)	(0.0032)	(0.0028)	(0.0029)
Linguistic distance	0.0615***	0.0750***	0.0755***	0.0891***
	(0.0052)	(0.0056)	(0.0049)	(0.0052)
Geographic distance	0.0243***	0.0224***	0.0195***	0.0167***
	(0.0005)	(0.0006)	(0.0005)	(0.0005)
Observations	211096	149242	235000	175451

Source: 2008-2010 ACS PUMS. Sample restricted to the foreign born aged 25-64 at time of survey who immigrated at age 18, were not naturalized prior to arrival and who have resided in the United States for five or more years (3 years for those who served in the US military or are married to a US citizen).
Robust standard errors in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
All controls specified in the estimation section are included.

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Department of Economics and Business, Lake Forest College, Lake Forest, Illinois: Principles of Economics, Applied Statistics, Health Economics, Labor Economics, 2010-2014.

Brennan School of Business, Dominican University, River Forest, Illinois: Principles of Macroeconomics, 2010.

Johns Hopkins University Center for Talented Youth, Johns Hopkins University, Baltimore, Maryland: Macroeconomics and the Global Economy, 2010-2011

Johns Hopkins University Center for Talented Youth, Hong Kong University of Science and Technology, Hong Kong, SAR,: Macroeconomics and the Global Economy, 2012

HONORS: Academic Scholarship, College of Lake County, Grayslake, Illinois, 2004

National Dean's List, College of Lake County, Grayslake, Illinois, 2004

Phi Theta Kappa, College of Lake County, Grayslake, Illinois, 2004

Phi Theta Kappa Scholarship, Lake Forest College, Lake Forest, Illinois, 2005, 2006

Forester Foreign Language Scholarship, Lake Forest College, Lake Forest, Illinois, 2005, 2006

National Dean's List, Lake Forest College, Lake Forest, Illinois, 2005, 2006

Omicron Delta Epsilon, Lake Forest College, Lake Forest, Illinois, 2006

VITA (continued)

Distinction for Senior Thesis, Lake Forest College, Lake Forest, Illinois, 2006

Phi Beta Kappa, Lake Forest College, Lake Forest, Illinois, 2007

Council of Higher Education Scholarship, University of Illinois at Chicago, Chicago, Illinois, 2009 – 2012

Elizabeth Bass Award, University of Illinois at Chicago, Chicago, Illinois, 2010

Oscar Miller Award for Teaching Excellence, University of Illinois at Chicago, Chicago, Illinois, 2011

PROFESSIONAL MEMBERSHIP: American Economic Association
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