The Political Economy of High-Skilled Immigration: Sponsorship and votes on High-Skilled Immigration Bills in the U.S. Congress

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Abstract

High-skilled immigrants and foreign nationals are an essential component of a country's economic competitiveness, particularly in the Science, Technology, Engineering, and Mathematics fields. Yet only a small number of foreign nationals are allowed to work in the United States. This paper examines (1) how high-skilled immigration bills in the U.S. have evolved over time and (2) what factors determine high-skilled immigration policy. I relax the fixed-demand assumption of previous research and develop a new theory of the *dynamic demand* for high-skilled immigration in which a greater supply of skilled labor generates greater demand for skilled labor, possibly creating a virtuous cycle. I focus on liberalizing bills which I categorize into *expanding* and *zero-sum*. *Expanding* bills aim to increase the number of high-skilled immigrants, while *zero-sum* bills are designed to increase high-skilled immigration at the expense of other types of immigration. To empirically test my theory, I constructed a new legislator-bill level dataset based on high-skilled immigration bills in the House of Representatives, H-1B visa applications, and lobbying reports from 2003 to 2019. I find that high-skilled immigration bills have become more zero-sum in nature over time. Consistent with the dynamic demand theory, I find that demand is a significant factor affecting representative support for high-skilled immigration and that the effect of demand differs by bill type and partisanship. Democrats favor expanding bills, while Republicans favor zero-sum bills. I also find that Democrats are more sensitive to the demand for skilled foreign workers in their districts and react more favorably to expanding high-skilled immigration bills. This finding challenges the conventional wisdom that Republicans are more supportive of all types of high-skilled immigration policy due to their business-friendly nature. By considering the multifaceted nature of immigration bills as opposed to the binary liberalizing/restrictive classification used in past research, this paper unveils hidden dynamics between the labor market factor (demand) and the political factor in immigration policymaking.

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1 Introduction

Recruiting and maintaining a foreign workforce is essential for a country to become more competitive in the global economy, particularly in the fields of science, technology, engineering, and math (STEM). However, despite the fact that many talented foreign nationals come to the U.S. to study, few of them are allowed to stay and work afterwards. According to data from the U.S. Citizenship and Immigration Services, only 35% of the foreign nationals who applied for the H-1B visas in 2019 received them. Erdal Arkin, a Turkish citizen who came to the U.S. to study for a Ph.D., exemplifies the broader economic significance of this kind of "brain drain" because after he failed to find a domestic sponsor for his H-1B visa, he returned home and collaborated with China's national telecommunications company to invent 5G technology[1]. If policies to attract talent functioned better, people like Erdal Arkin would be able to remain in the U.S. Instead, they are often recruited by countries that are more successful in attracting the most talented foreign workers (Brücker et al., 2012; Cerna, 2014). Currently, there are more foreign nationals than there are native citizens studying for advanced STEM-related degrees in the United States, so there is clearly a significant discrepancy between what American STEM-related higher education is investing in and what is being generated from that investment.

Almost every U.S. Congress has attempted to reform high-skilled immigration policy. Given the positive effects of high-skilled foreign workers on the economy, it is puzzling that its members have rarely been able to reach a consensus. However, determining the ideal number of high-skilled foreigners is a perennial challenge for the U.S. government, which must both protect the jobs of native citizens and balance the number of high-skilled immigrants with the numbers of other types of immigration. Significantly, there has been few systemic analysis of either the economic or the political factors that affect the making of high-skilled immigration policy (Liao, 2022; Facchini et al., 2011; Kolbe, 2021). Previous studies on immigration policy mainly concern low-skilled immigration, particularly in the field of international political economy. In addressing these deficits, this study will provide a rich analysis of the dynamics behind high-skilled policymaking, helping both the public and policymakers to better understand high-skilled immigration.

[1]https://foreignpolicy.com/2022/07/16/immigration-us-technology-companies-work-visas-china-talent-competition-universities/

This study asks the following questions: 1) how has high-skilled immigration policy evolved in the U.S. and 2) what factors impact politicians' support for liberalizing high-skilled immigration policy? To answer the first question, I track high-skilled immigration bills from 2003 to 2019. These bills have been introduced in every Congress, and they come in two basic forms: *restrictive* and *liberalizing*, or *open*. Restrictive bills aim to reduce high-skilled immigration, and in most cases, they are introduced to strengthen processes associated with the monitoring of visas. In contrast, liberalizing high-skilled immigration bills are designed to directly or indirectly increase the number of high-skilled immigrants. Liberalizing bills generally fit into two categories: *expanding* bills and *zero-sum* bills. An expanding bill solely aims to increase the number of high-skilled immigrants, increasing the total number of immigrants in the process. On the other hand, a zero-sum bill aims to increase high-skilled immigration at the expense of other types of immigration, leaving the total number of immigrants either fixed or somewhat reduced. Over the years, the nature of liberalizing immigration bills has become increasingly zero-sum. The fact that Republicans and Democrats have typically responded to zero-sum bills in divergent ways has created polarization in regard to high-skilled immigration policy.

In regard to the factors that affect high-skilled immigration policymaking, I put forward a theory that takes into account two primary factors: 1) the demands of companies for high-skilled foreign workers and 2) partisanship. I propose a theory of *dynamic demand*, in which a high level of demand for labor induces a high supply of labor, which in turn increases demand even further, possibly creating a virtuous cycle. This model relaxes the fixed demand assumption of previous research models in which demand remains fixed and the supply of foreign workers increases competition for those with similar skills. Most immigration studies focus on the supply of labor and do not consider the demand for foreign workers, although both Peters (2014) and Pardos-Prado and Xena (2019) do emphasize the importance of demand for labor. Previous research that used the fixed demand assumption suggests that native citizens and immigrants are substitutes in the labor market. Scholars argue that native citizens would oppose the influx of foreigners with similar skills and find supportive evidence at aggregate (district)-level (Conconi et al., 2020; Facchini & Steinhardt, 2011; Gonzalez & Kamdar, 2000; Facchini & Mayda, 2009; Milner & Tingley, 2011b; Hanson et al., 2007), but not at individual-level analysis (Hainmueller & Hopkins, 2015). These previous studies do not capture or measure the critically variant nature of the demand for foreign

workers. I argue that we should relax the fixed demand assumption, directly measure the demand for foreign workers, and incorporate it into the study of immigration in order to fully capture the dynamics between the labor market factor (demand) and the political factor in regard to immigration policymaking.

Utilizing the dynamic demand model, I show that high demand for skilled foreign workers and partisanship both strongly affect the development of liberalizing high-skilled immigration policy, and that these factors interact with each other differently depending on whether the liberalizing immigration bill in question is expanding or zero-sum. I theorize that Republicans are more favorable toward zero-sum high-skilled immigration bills, because these typically align well with their values. In contrast, Democrats find it difficult to favor high-skilled immigration bills at the expense of other types of immigration. This is because Democrats give more consideration to constituents affected by zero-sum policy. They hesitate to sacrifice immigrants with family ties or with relatively low-skills for the benefit of high-skilled immigrants. Democrats are therefore more likely to favor expanding bills because these bills release them from the pressure of choosing one over the other. I further expect that the effect of demand for skilled foreign workers on sponsoring expanding bills increases for Democratic representatives, while the effect of demand on sponsoring zero-sum bills is positive for Republican representatives.

To analyze sponsoring and voting behavior in the U.S House of Representatives, I collected information regarding 88 high-skilled immigration bills introduced from 2003 to 2019. To measure the demand for high-skilled foreign nationals, I collected labor condition applications (LCA's) available from 2003 and extracted the number of skilled foreign nationals on behalf of whom companies applied for H-1B visas. I find that both the demand for high-skilled foreign workers and partisanship affect sponsoring and voting for either type of high-skilled immigration bills and that the effect of demand for high-skilled foreign workers is moderated by partisanship. These effects differ by immigration bill type. Democratic representatives and Republican representatives react differently to specific high-skilled immigration bills even though these bills each aim to increase high-skilled immigration. I find that Democratic representatives are more sensitive to the demand for skilled foreign workers in their districts than are Republican representatives. I also find a more polarized outcome for zero-sum immigration bills. Moreover, once I include the demand variable, the supply variable (skill levels of population in congressional districts) loses its statistical

significance.

The dynamic demand theory concerns high-skilled immigration in the United States, but this theory - in conjunction with partisanship - can be applied to other advanced economies that attract talent around the world. These countries also face the two competing pressures of recruiting talent and protecting the jobs of their citizens at a time when the public is becoming extreme in regard to political ideology. Though the dynamic demand model might not apply to low-skilled immigration, inclusion of the demand for low-skilled foreign workers, directly measured, will provide meaningful implications as well. Such analyses will tell us whether the demand for foreign workers is significant for immigration policy making regardless of skill levels.

This paper makes three main contributions. First, this paper offers a theory of dynamic demand for skilled labor, in a setting where a virtuous cycle of labor demand and supply is possible. In doing so, this paper shifts the focus of immigration from the existing supply of labor to the actual demand for foreign workers. Second, this paper shows that the binary categorization of immigration bills into liberalizing or restrictive, widely used in previous studies, does not capture a complete picture of immigration. I find even liberalizing bills to be heterogeneous and multifaceted in nature. Moreover, a nontrivial number of bills address different types of immigration and intend to increase certain types of immigrants at the expense of other types of immigration. I show that a detailed categorization of liberalizing bills makes it possible to unveil the hidden dynamics between labor market factors and political factors and deepen our understanding of high-skilled immigration policymaking. Third, this paper constructs a new dataset by making a direct measurement of the demand for high-skilled foreign workers. Further, it uses the number of STEM degree holders instead of the number of bachelor's degrees in districts to capture the high-skilled population. This better captures competition dynamics in regard to high-skilled immigration, because according to the U.S. Citizenship and Immigration Services (USCIS), most high-skilled immigrants work in STEM-related fields.

This paper proceeds as follows. Section 2 presents a relevant literature review; Section 3 provides an overview of high-skilled immigration bills; Section 4 discusses theory; Section 5 explains data and empirical strategy; Section 6 presents an empirical analysis, and Section 7 concludes.

2 Literature review: Theories on immigration policy

This section reviews theoretical expectations about the factors affecting high-skilled immigration policy. The factor endowment model is the canonical model that has been used to study attitudes toward immigration and trade. Most immigration, be it low-skilled or high-skilled, studies have the assumption of the factor endowment model. This section highlights labor market factors driven from the conventional economic endowment model as well as political factors that come from ideology.

2.1 Factor-endowment model

In the factor endowment model, districts or countries are endowed with different percentages of high-skilled and low-skilled labor (Facchini & Steinhardt, 2011). In this model, the supply of high-skilled foreign workers increases the supply of high-skilled labor, increasing labor market competition and driving down the wages of high-skilled native citizens, while increasing the wages of low-skilled workers. On the other hand, the supply of low-skilled immigrants drives down the wages of low-skilled native citizens but increases the wages of high-skilled native citizens. Thus, high-skilled native citizens should theoretically oppose high-skilled immigration but support low-skilled immigration. Based on this canonical model, we expect office-seeking politicians from districts with a high-skilled native population to oppose high-skilled immigration.

Most empirical work using the factor-endowment model focuses on low-skilled immigration and finds supportive evidence for labor market competition (Facchini & Steinhardt, 2011; Gonzalez & Kamdar, 2000). In general, scholars have found that politicians support or oppose immigration based the on skill levels of their constituents. For example, to measure skill levels at an aggregate level, scholars use either the percentage or the number of those in their districts who have at least a bachelor's degree. Using these measurements, researchers found evidence consistent with expectations from the factor-endowment model that native citizens oppose the influx of foreigners with similar skills. For example, using roll call votes from the period of 1970–2006, Facchini and Steinhardt (2011) find that representatives who have higher proportions of skilled labor in their congressional districts are more likely to support low-skilled immigration, whereas representatives from low-skill-abundant districts are more likely to oppose low-skilled immigration. Similarly, the

proportion of high-skilled and low-skilled labor in congressional districts has a significant effect on politicians' voting behavior in a study by Gonzalez and Kamdar (2000). They examine the 1996 Illegal Immigration Reform and Immigration Responsibility Act (H.R. 2202) and find that districts with a greater share of workers in low-skilled industries are more likely to support immigration restrictions. Using roll call vote data, scholars have also found supportive evidence of the factor endowment model for trade policy, finding that politicians from districts with more skilled labor or capital tend to vote in favor of free trade (Milner & Tingley, 2011b; Bailey, 2001; Choi, 2015; Conconi et al., 2014; Owen, 2017; Hosek & Peritz, 2022). Those who examined the characteristics at an industry level similarly found that districts with import-competing industries tend to oppose free trade (Choi, 2015; Hiscox, 2002).

Taking a slightly different approach, some scholars argue that labor market effects can be moderated by concerns about welfare spending (Facchini & Mayda, 2009; Hanson et al., 2007). High-skilled native citizens do not want to pay taxes to support welfare programs that benefit low-skilled immigrants. According to this line of reasoning, we would expect that high-skilled native citizens would not support liberalizing low-skilled immigration, although that might depend on the level of redistribution in their districts. Milner and Tingley (2011a) similarly argue that legislators from areas with more high-skilled individuals and higher welfare spending are more likely to oppose open immigration policy.

Significantly, findings based on labor market characteristics often conflict with individual-level studies in which labor market factors are not the main driver of attitudes toward economic integration. For example, Hainmueller and Hopkins (2015) found that at an individual level, native citizens tend to prefer high-skilled immigration regardless of their own skill levels. that failing to consider the demand for foreign workers in these studies may account for inconsistent findings between different levels of analysis.

2.2 Multinational firms and firm lobbying

Scholars have empirically examined the role of corporate lobbying in policy-making. Facchini et al. (2011) uses lobbying data and the number of visas received at the industry level to find that both pro-immigration and anti-immigration interest groups affect immigration policy in the U.S. They

examine the allocation of H-1B visas for skilled labor across US industries and find that industries that spend more on lobbying ended up with the largest number of visas. Liao (2022) also finds that corporate lobbying reduces the decline rates of the H-1B visas needed to hire high-skilled foreign workers in the U.S. These studies examine corporate lobbying as it reflects companies' desire to affect certain policies, but given that only a few companies can manage to lobby, lobbying does not fully capture industry demand.

Scholars have put forward two theories on lobbying in the trade literature. The first one is the protection for sales model by Grossman and Helpman (1992). In this model, organized business sectors lobby the government for trade protection, and the government chooses trade protection if the benefit from lobbying exceeds the benefit coming from the welfare of the general public. Another model is the protection formation function model (Goldberg & Maggi, 1999), where two opposite interests (pro-trade and anti-trade) compete and offer contributions to the government. This model implies that intense lobbying from interest groups that favor protection (free trade) leads to more protection (free trade). The idea is that companies that benefit from globalization - whether trade or immigration - actively lobby in favor of liberalizing globalization policy. Based on these two models, we would expect to see intensive lobbying from companies that benefit from high-skilled immigration.

Born (2019) highlights the network of multinational firms (MNCs) in diffusion of high-skilled immigration policy. She shows that the interdependence in promoting liberalizing high-skilled immigration policy in OECD countries is correlated with the growing network of MNCs in these countries.

2.3 Partisanship

Apart from these theories that emphasize labor market factors, scholars have found partisanship to be an important factor in shaping high-skilled immigration policy. For example, Kolbe (2021) finds that partisanship influences high-skilled immigration policies by using survival analyses of nineteen European countries. Her study shows that right-leaning governments promote high-skilled immigration policies, whereas left-leaning governments delay this type of policy. She argues that right-leaning parties are better able to resolve conflicts regarding high-skilled immigration within

their party because the benefits that high-skilled immigrants bring to society align with their values, such as promoting a free market and reducing the welfare burden using the high taxes paid by high-skilled immigrants. Kolbe also argues that her findings corroborate the argument that skilled immigration policy is shaped by political variables rather than by labor market-driven factors (Carvalho, 2014). Similarly, while Wright (2015) recognizes the importance of labor market factors, political ideology and party legacy should be taken into account in studying high-skilled immigration policy. This contrasts with the argument that labor market actors such as companies, organized businesses, or labor unions affect high-skilled immigration policy more so than do than political factors (Peters, 2014; Facchini & Willmann, 2005; Freeman & Tendler, 2012; Bauer & Kunze, 2004).

2.4 Interest groups and coalitions

Cerna (2014) focuses on coalitions between high-skilled labor, low-skilled labor, and capital and argues that how the coalitions interact with institutions and shape different high-skilled immigration policy outcomes across different countries. On the other hand, Bastian (2009) argues that special groups such as companies and labor unions alone cannot shape the immigration policy in the United States. Rather, support from the public is also crucial for an immigration policy to pass. Similarly, Kennedy (2019) emphasizes the importance of understanding the dynamics between capital, such as high-tech employers, and citizens. He argues that special interest coalitions have weakened, as there have been efforts to pass a comprehensive immigration bill that includes all types of immigration. He further asserts that anti-immigration sentiment has increased among the public, which affects immigration policy. Most studies that emphasize the dynamics between interest groups and the public review immigration policies in chronological order with a narrative, rather than using quantitative analysis.

2.5 The role of naturalized citizens

Wong (2017) argues that partisan polarization and the changing demographics of the electorate in the United States shape immigration policy. Specifically, he argues that immigrants who became naturalized citizens play a significant role in immigration policymaking. With respect to

partisanship, he argues that Republicans are more likely to support restrictive immigration policies than Democrats. In his analysis, Wong does not divide immigration types into low-skilled and high-skilled and instead, takes all types of immigration bills into account in both the House of Representatives and the Senate. He argues that naturalized citizens drive immigration policy in a more liberalizing direction by shifting median voter preferences away from restrictive immigration policies. However, he further argues that in districts where these demographic changes are not felt, legislators are unlikely to move to more open immigration policies - particularly when partisanship remains deeply entrenched. According to this theory, it is expected that politicians from districts with a high proportion of naturalized citizens are more likely to support liberalizing immigration policy.

2.6 Related literature on polarization and economic impacts of high-skilled immigration

This paper draws from the literature on polarization in the United States. Many studies have found a growing level of polarization among the public in American society (Whitt et al., 2021; Bekafigo et al., 2019), particularly since Trump took office in 2016. Scholars found that white working-class voters were discontent and are afraid of losing their status to minority groups after Obama took office (Baccini & Weymouth, 2021). These feelings of fear and insecurity were further exploited by Trump, and attitudes toward immigration became more polarized (Abramowitz & McCoy, 2019). This paper further finds polarization with respect to high-skilled immigration bills in Congress.

This paper is also based on some findings on the effects of high-skilled immigration on the employment and wages of native citizens and the productivity of host countries. For example, Mayda et al. (2018) found that the H-1B visa cap restrictions did not increase the employment of similarly skilled native workers. Kerr and Lincoln (2010) found that an increase in high-skilled immigrant workers led to an increase in the number of patents by foreign nationals in the United States. Similarly, Peri et al. (2015) finds that the increase in foreign STEM workers increased the wages of high-skilled natives, accompanied by a small increase in the wages of low-skilled natives. Ghosh et al. (2016) also found that an increase in the number of H-1B visa workers leads to an increase in the profits, size, and productivity of H-1B visa-dependent and R&D intensive firms. This line of research provides supportive evidence of the dynamic demand theory that I put

forward in this paper. The increased supply of skilled labor increases profits and productivity of companies, which further increases the demand for skilled labor.

3 Overview of High-skilled immigration bills in the U.S.

This section explains immigration types in the United States and examines how the nature of immigration bills has evolved over time in the United States.

3.1 Immigration types in the United States

There are four main channels through which foreign individuals legally immigrate to the United States. According to data from the Department of Homeland Security, immigration based on (1) family ties makes up the majority of legal immigration (66%). The remainder of legal immigration is based on (2) ties to employers (14%), (3) humanitarian protection for refugees (13%), and (4) the diversity visa program (4%), which is often called the green card lottery. These channels are typically restricted by a per-country cap that stipulates that no country can receive more than 7 percent of the total number of employment-based or family-based visas per year. However under family reunification, the immediate family of U.S. citizens such as spouses, unmarried children, and parents are allowed to apply for immigrant visas, and there is no cap set for this category. U.S. citizens can also sponsor other types of relatives, but there is a cap set at 226,000 green cards for this category.

High-skilled immigration falls into the category of employment-based immigration, which is subject to a cap of 140,000. Under employment-based immigration, most immigrants need an employer to sponsor a green card, except for a few exceptionally skilled individuals. Most of this employment-based immigration comes from H-1B visa holders with employers who are willing to sponsor green cards. The H-1B visa is technically defined as a non-immigrant visa that allows foreign nationals to work in the U.S. for 6 years. However, in practice, it allows skilled foreign nationals to have dual intent to immigrate to the United States and to petition for permanent residency. The per-country cap has created a backlog regarding employment-based visas for foreign nationals of countries that have a high immigration rate to the U.S such as India. Accordingly,

there have been many immigration bills introduced to resolve backlog issues, and these will be discussed in the subsequent section.

The diversity visa program is for foreign individuals who come from countries that send fewer immigrants to the U.S. It randomly selects applicants from countries with a low immigration rate to the U.S. and has a quota set at 50,000 per year. Foreign nationals are also granted to live in the U.S. if they fall into the category of refugees and asylum seekers.

3.2 Bill type: How immigration bills have evolved

I categorize high-skilled immigration bills into liberalizing bills and restrictive bills, examining the period from 2003 to 2019. Within liberalizing bills, I categorize bills into two types: *expanding* bills and *zero-sum* bills. Table 1 presents a high-level summary of these bills. The list of 86 high-skilled immigration bills is included in Appendix A.4. Expanding bills are designed to increase high-skilled immigration. Zero-sum bills also aim to increase high-skilled immigration, but at the expense of other types of immigration such as diversity or chain immigration.

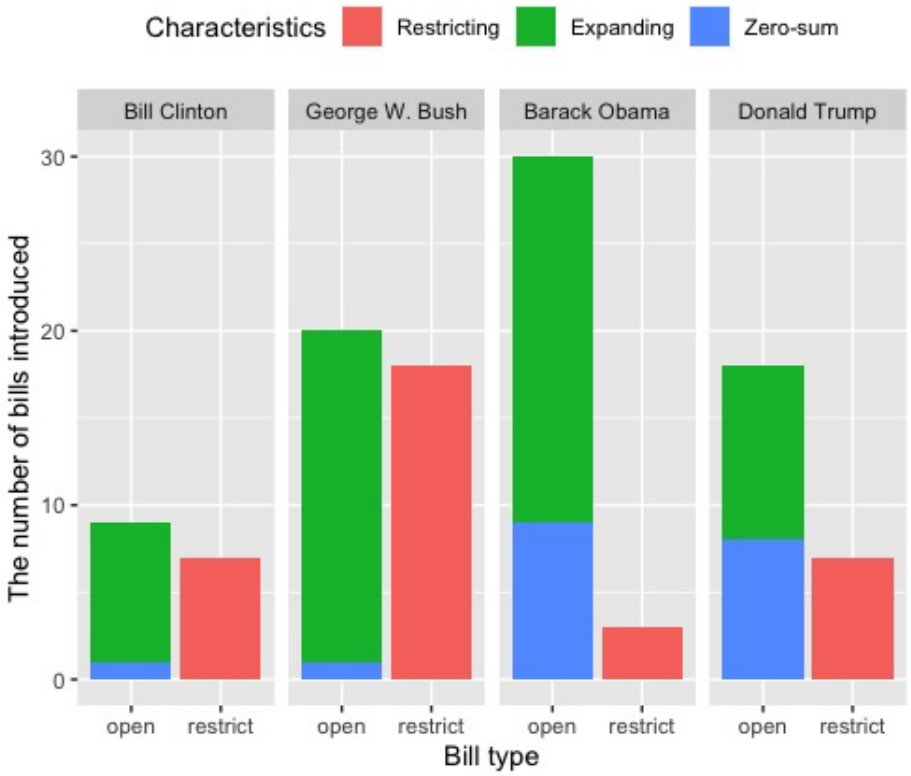
Table 1: Bill type

Category	Bill type	Features
Liberalizing (Open)	Expanding	Increase the number of high-skilled immigration Eliminate per-country cap for employment-based immigration Increase the number of H-1B visas for STEM students
	Zero-sum	Increase employment-based immigration while eliminating/reducing diversity visa or family reunification Eliminate diversity visa program
Restricting	-	Strengthen monitoring of H-1B visa Eliminate optional practical training for international students Protect skilled American workers with restrictive H-1B measures

Over the years, the nature of open immigration bills has become more zero-sum. As shown in Figure 1, the share of these zero-sum immigration bills has increased, especially during the Trump administration. The Trump administration pursued merit-based immigration policies in which only highly experienced foreign nationals who are paid high salaries were allowed to work in the U.S., while aiming to reduce or eliminate other types of immigration such as family reunification and

the diversity visa program.

Figure 1: High-skilled immigration bills by president



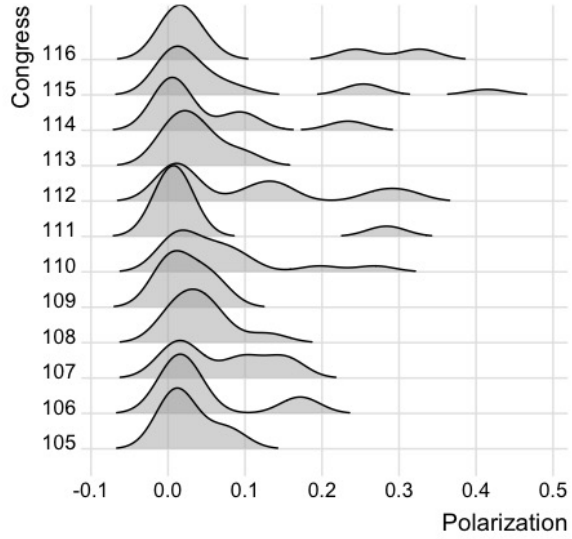
Applying the logic behind the Rice index (Rice, 1928), I calculate party polarization of legislative sponsoring as the absolute distance between the ratio of Democrats and Republicans who sponsored bill i as shown below. The further away the distance is from zero, the more polarized Congress is.

$$Distance_i = \left| \frac{Democrats\ sponsoring\ bill_i}{number\ of\ Democrats\ in\ Congress} - \frac{Republicans\ sponsoring\ bill_i}{number\ of\ Republicans\ in\ Congress} \right|$$

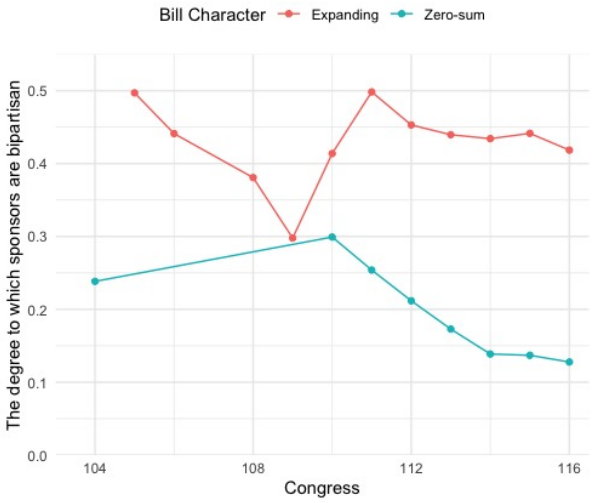
I then plot these distances of all the high-skilled immigration bills for each Congress from the 105th to the 116th as shown in Figure 2a. The distributions of the distances look similar in each Congress, but we observe skewness on the right tails in recent congressional sessions, which reflects polarization. This pattern of polarization is correlated with the increasing rate of zero-sum immigration bills as shown in Figure 1. In Figure 2a, I calculate the standard deviation

of the ideology scores (DW-NOMINATE 1) of all the congressmen who sponsored bills in each Congress. The smaller standard deviation means that a bill receives sponsors from the same party, whereas large standard deviation means that a bill receives bipartisan sponsors from two parties. The smaller the standard deviation is, the more polarization it reflects. Zero-sum bills show extreme polarization.

Figure 2: Patterns of polarization



(a) Polarization by Congress



(b) Standard deviation of ideology scores by bill type

3.3 Tech industry and skilled foreign workers

Most existing studies view high-skilled immigrants as people who have bachelor's degrees (Facchini & Steinhardt, 2011). However, I argue that looking more specifically into which industries and occupations hire the most skilled foreign workers provides a more accurate picture of the landscape of high-skilled immigration. For example, STEM-related fields have tried to hire skilled foreign nationals, especially those who have advanced degrees such as master's and PhDs. This is because there are more foreign nationals than there are native citizens studying for advanced STEM-related degrees in the United States (according to the analysis based on data provided by the National Science Foundation which is included in Appendix A.2). The tech industry, more specifically computer-related occupations, utilizes 80% of H-1B visas according to USCIS. This sector will be important in discussing the theoretical framework of this paper.

4 Theory of dynamic demand

This section introduces a theory of dynamic demand in which greater supply of labor leads to greater demand for labor, which further could increase the supply of labor, creating a virtuous cycle. High-skilled immigration is not just the inflow of people but the inflow of knowledge and human capital that create a virtuous cycle in the industry.

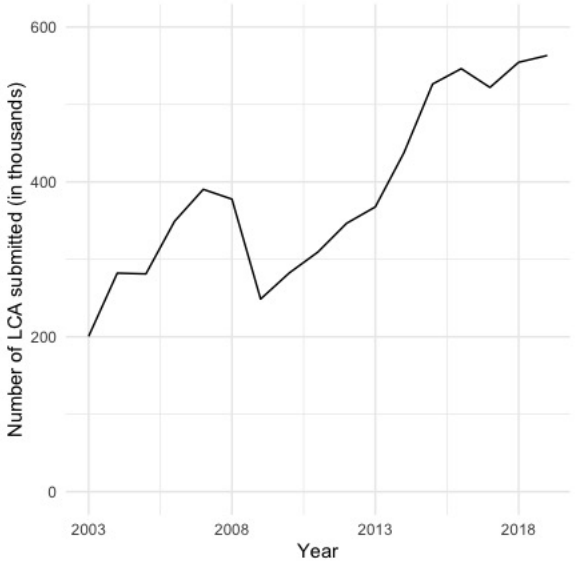
4.1 Demand for skilled foreign labor

I argue that demand for skilled foreign workers is the key to understanding the determinants of high-skilled immigration policy. I define the demand for skilled foreign labor as the number of skilled foreign workers that companies are willing to hire in a given hiring cycle.

The setting in which this theoretical framework operates is different from that of the conventional economic factor endowment model, in which foreign nationals and native citizens compete for jobs in a limited setting. In the conventional model, the demand is assumed to be fixed, while the supply of labor is increased due to the inflow of foreign workers: if someone takes a job, it happens at the expense of the other competitors. If representatives in districts with a lot of high-skilled native citizens believe this to be the case and they act for their constituents, they are likely to oppose high-skilled immigration because their constituents do not want to compete with high-skilled foreign workers. They may also share their constituents' belief that foreign workers drive down wages. However, the demand for skilled labor is not fixed in the real world and has actually increased as demonstrated by the increasing number of H-1B cap dependent labor condition applications that companies submitted to hire skilled foreign workers in Figure 3.

I argue that districts with greater numbers of skilled workers (both native and foreign) are more likely to show high demand for foreign workers, and representatives of these districts are more likely to support high-skilled immigration. Sectors such as the technology sector continuously create innovation with their workforce and further increase demand. Indeed, cities such as Silicon Valley, Boston, Seattle, and Austin where the technology sector is concentrated, are known as innovation hubs (Moretti, 2012). In other words, the demand is not fixed given the supply of labor, and the output of the workforce and the demand for it can create a virtuous cycle in which supply of skilled labor creates a high demand for skilled labor. The evidence of this dynamic demand is

Figure 3: Number of LCAs submitted



presented in Appendix A.6.

How is this cycle created? In these sectors, firms cluster together (Moretti, 2012). The cluster of companies creates synergy by actively exchanging ideas among people in the sector, ultimately leading to the launch of more projects and increasing the demand for skilled workers. The high demand for workers within this cluster comes from two additional sources, individual companies and entrepreneurs. As the speed at which companies grow increases, so does their demand for workers. Similarly, entrepreneurs who start companies also increase demand for skilled workers in the cluster. These entrepreneurs may start as entrepreneurs or they may become entrepreneurs after working at another startup or established company. Skilled immigrants have found to expand demand by starting new firms (Azoulay et al., 2022).

High demand for labor applies to both native-born citizens and foreign nationals. There are already large numbers of people, both native citizens and foreign nationals, working in the cluster. The number of foreign-born nationals is relatively higher in the information technology (IT) industry than it is in other industries, but the number of native-born citizens is still much higher than the number of foreign-born individuals. According to the U.S. Bureau of Labor Statistics, 133,798 native-born citizens worked in the IT industry in 2014, along with 26,730 foreign-born nationals (naturalized citizens and foreign-born nationals). Thus, districts with already a high population of STEM workers tend to show high demand for skilled workers.

As mentioned in the previous section, more foreign nationals study STEM fields in advanced programs in the U.S. Many employers attempt to increase the number of skilled foreign workers, and accordingly try to influence policy making, either informally or through campaign contributions and lobbying. Representatives of districts with high demands for foreign workers are likely to be well aware of the needs for skilled foreign workers in their districts and may want to reflect the needs of their districts in policymaking. One of the mechanisms through which representatives get to know these needs is through interactions with company executives and staff. If businesses create profits and employment opportunities in districts, representatives are more likely to make efforts to satisfy their needs. Companies with high demands for skilled foreign workers often lobby representatives for specific immigration bills. Representatives in turn try hard to make the immigration bills pass in Congress. Therefore, I expect that representatives from districts with high demand for high-skilled foreign workers are likely to sponsor or vote for liberalizing high-skilled immigration bills.

- H1: Representatives from districts with high demand for skilled foreign workers are more likely to sponsor or vote for liberalizing high-skilled immigration bills.

4.2 Immigration bill type and Partisanship

The market factor (demand for labor) alone is not the sole determinant of high-skilled immigration policy. Partisanship is also an important factor, and it moderates the effect of the demand for high-skilled foreign labor. Preferences toward immigration do not always reach a consensus within a political party. Republicans are known to prefer restrictive immigration policy, but at the same time for being business friendly. Democrats are known to support liberalizing immigration policy, and more firms that hire skilled foreign workers are located in districts that have Democrat representatives than Republican representatives (See the Appendix). But at the same time, they are labor union-friendly.

I expect that the effect of partisanship will vary depending on immigration bill type. Regarding zero-sum bills, it is easy for Republicans to favor high-skilled immigration over other types of immigration because the benefits of high-skilled immigration align well with the values that Republicans pursue; high-skilled immigrants pay high taxes and rely less on welfare programs.

However, it is more difficult for Democrats to favor one type of immigration over another, given their values of equality and universalism. With respect to expanding bills, Democrats are free from such pressure of choosing one type of immigration over another and are more likely to support expanding immigration bills without sacrificing other types of immigration. On the contrary, Republicans oppose the idea of increasing the number of immigrants. Based on this, I derive the following hypotheses.

- H2: Democrats are more likely to sponsor or vote for **expanding** high-skilled immigration bills.
- H3: Republicans are more likely to sponsor or vote for **zero-sum** high-skilled immigration bills.

It is difficult for Democrats to favor zero-sum bills at the expense of other types of immigration, even though a large number of firms demand high-skilled foreign workers in their districts. Thus, the effect of demand on sponsoring a zero-sum bill will be less strong when Democrats represent districts. Democrats are pressured and more constrained by their party in sponsoring a zero-sum bill. On the other hand, the demand will have a larger positive effect on sponsoring a zero-sum bill for Republicans, as they favor high-skilled immigration while reducing other types of immigration. The high demand for skilled labor from their districts will make them even more likely to sponsor zero-sum bills. Regarding expanding bills, Democrats are not constrained by pressure from their party and do not have to sacrifice other types of immigration for high-skilled immigration. Thus, the effect of demand for skilled foreign labor on sponsoring expanding bills will be positive when Democrats represent districts. This does not mean that Republicans necessarily oppose expanding bills. Republicans still prefer high-skilled immigration to other types. However, the degree to which Democrats support expanding bills is likely to be higher than Republicans. Table 2 summarizes expectations of marginal effects of demand with respect to bill type and political parties.

- H4: Demand will have a larger positive effect on sponsoring **expanding** bills if a representative is a Democrat.

- H5: Demand will have a larger positive effect on sponsoring **zero-sum** bills if a representative is a Republican.

Table 2: Marginal effect of demand

Party/Bill type	Expanding bills	Zero-sum bills
Democrats	Positive	Neutral/no effect
Republican	Neutral/no effect	Positive

The opposite expectations of the results by immigration bill type already signal different responses from the political parties. The zero-sum bills contain more points of contention than expanding bills as demonstrated by Table 2. Thus, I expect that zero-sum bills to be positively associated with an increase in polarization. On the other hand, restrictive bills are easier to reach a consensus on because they are designed to protect the jobs of native citizens by enforcing strong visa monitoring processes.

- H6: Zero-sum immigration bills are positively associated with an increase in polarization.

5 Data construction

In this section, I describe how I create datasets for sponsorship and roll call votes and construct the main variables.

(1) High-skilled immigration bills

I first collected high-skilled immigration bills at the Government track website [2]. On the website, I chose the subject area "immigration" and identified high-skilled immigration bills from the 108th to the 116th sessions of congress, covering the years 2003 to 2019. I chose this time frame because data regarding demand for high-skilled workers first became available in 2003. Out of 86 high-skilled immigration bills introduced in this time frame, 66 immigration bills are liberalizing (both expanding and zero-sum). The exhaustive list of these bills is included in the Appendix. For each bill, I collected the following: the bill title, the content, the date introduced, the sponsor, and the

[2]https://www.govtrack.us/congress/bills

cosponsors of the bill. I then collected information about each House representative's party and ideology score using Lewis et al. (2020)'s voteview database. I then created a bill-legislator dataset for sponsorship by linking bills to information about House representatives.

To classify bills as either expanding, zero-sum, or restrictive in regard to high-skilled immigration, I read the content of the bills and cross-checked them with bill analyses from immigration-related websites [3]. I further clarified the bill types by reading the reactions from involved parties such as pro-immigration lobbying groups or anti-immigration labor unions.

The main analyses of this paper are based on whether or not representatives ultimately sponsor the liberalizing high-skilled immigration bills introduced. The analysis of roll call votes is conducted as a robust check. For immigration bills that received roll call votes, I cross-validate the bills collected on the Government track website with the bills that I downloaded from the voteview database. I then match these bills with each member's vote position, party, and ideology score. The outcome is a bill-legislator-level dataset that contains the following: bill name, bill content, date introduced, bill characteristics, member vote position, member party, and ideology score.

(2) Information about congressional districts

I use IPUMS national historical GIS data to get congressional district-level information such as unemployment, median income, the number of people with STEM degrees, population demographics such as the number of non-citizens, the number of naturalized citizens, the number of Hispanics, and the number of African Americans. I then link this data to sponsorship and roll call vote datasets.

(3) Demand for high skilled foreign workers

Demand for high-skilled foreign workers reflects the number of foreign nationals that companies are willing to hire in a given year. To measure company-level demand for high-skilled foreign workers, I use labor condition applications (LCA's) available from the U.S. Department of Labor (DOL). Companies first need to fill out LCA with the DOL before they fill out a petition with the

[3]National Immigration Forum(immigrationforum.org), Center for Immigration Studies (cis.org)

U.S. Customs and Immigration Services. Companies need to pay application fees, and there is no limit on the number of LCAs that they can fill out. Thus, by looking at the number of foreign workers a company filled out as represented by LCA's, we can get information about the demand for high-skilled foreign workers.

Each LCA indicates the status of the application, including whether the application is certified, denied, or withdrawn. The reason for denials is mainly due to missing information in the LCA. I exclude LCA's with the status marked "withdrawn" because withdrawn applications can mean that the company no longer needs foreign workers. Furthermore, I only consider H-1B cap-dependent visa applicants because companies that are constrained by these caps are likely to persuade representatives to sponsor or vote for immigration policy. For this reason, I remove LCA's from universities, non-profit organizations, and research labs because they are exempt from the H-1B cap. I also exclude applications made on behalf of citizens from five countries that are exempted from the visa cap due to bilateral agreements with the U.S.(Australia, Canada, Chile, Mexico, and Singapore).

The LCA dataset contains the following: firm names, firm addresses, ZIP codes, job titles of foreign workers that firms want to hire, the number of foreign workers that each firm wants to hire, wages that will be paid to them, and occupation codes. I then use employer addresses (including ZIP codes) to match the LCA data with congressional districts using the geocodio service (https://www.geocod.io) for the 113th to 116th congressional districts (prior congress data are not available via geocodio). Prior to the 112th Congress, I use shapefiles to match companies" ZIP codes with their congressional districts. I then sum the number of foreign workers applied by congressional district to have the demand for high-skilled foreign workers by congressional district as an outcome. This is a conservative approach because I assume that demand for skilled foreign workers matters only to congressional districts where firms are located. However, there could be two congressional districts in the same commuter zone, and firms might try to influence representatives in other districts.

(4) Lobbying

Lobbying is a strong form of corporate support for specific bills. Although not all companies can afford to lobby for bills, the lobbying activities of a small number of companies can benefit others that also hire skilled foreign workers. Corporate lobbying often occurs through lobbyists in Washington D.C., but the lobbying report does not tell whether the lobbying was made in favor of or against a specific bill in most cases. However, from the news articles and statements of these firms, it is clear what direction these firms take with respect to a specific bill.

I extract firm lobbying reports for immigration bills from Opensecret [4]. The lobbying report provides names of companies and the amount of money they contributed, but does not provide details on who receives the money. I assume that lobbying decisions are mainly made in the headquarters of companies and that lobbying strongly affects congressmen in districts where the firms are headquartered. This is born out by the fact that companies always hired foreign nationals in the same year they lobbied for liberalizing high-skilled immigration bills.

This is a conservative measure (that could underestimate) the effect of lobbying because representatives in districts where few firms hire foreign workers could be also affected by lobbying. However, it is well-documented that big tech companies and representatives actively interact with each other in the districts where the companies are the main employers of the districts (e.g. those with headquarters and big branches). For example, Democrat Zoe Lofren (CA19) and Republican Kevin McCathy (CA23) have deep personal and financial ties to big tech companies in their districts. Several big tech companies have made intense efforts to introduce liberalizing high-skilled immigration bills. These firms target a number of congresspeople but they concentrate on representatives in districts where companies hire a large number of skilled foreign workers.

The lobbying amount is the approximate amount that a company spent to lobby for all bills during a given Congress. Since it is difficult to know the exact amount spent on high-skilled immigration bills, I chose to use a binary variable that takes 1 if there are firms in districts that lobbied for a high-skilled immigration bill in a given year and 0 otherwise. I then combine all the information I collected for demand for foreign workers, demographics, and lobbying for the bill-congressional district (legislator) level.

[4] www.opensecrets.org

6 Empirical analysis

6.1 Mechanisms for dynamic demand

My theory builds on dynamic demand, which captures the virtuous cycle of labor demand and supply. Many researchers have already shown evidence for this virtuous cycle in STEM-related fields. Using the newly constructed dataset, I estimate a linear model with state and year-fixed effects to see if there is evidence of the dynamic demand that creates a virtuous cycle in the labor market. The dependent variable is the demand for skilled foreign workers in district i at time t. The independent variable is the log of the STEM population in district i at time $t-1$. I assume that the STEM-degree holders will work in STEM-related fields. I also include the number of non-citizens and unemployment in district i at time $t-1$. The number of STEM workers in the previous year is positively associated with the current demand for foreign workers as shown in Table 16. Replacing the STEM population with bachelor's degree holders produces the same result.

Table 3: Skilled population and demand for skilled foreign workers

	Dependent variable:			
	Demand for skilled workers (t)			
	(1)	(2)	(3)	(4)
STEM population (t-1)	0.619***	0.521***		
	(0.004)	(0.004)		
Non-citizens (t-1)		0.392***		0.409***
		(0.006)		(0.006)
Unemployment (t-1)		−0.119***		0.038
		(0.027)		(0.026)
Bachelor's degree (t-1)			0.981***	0.834***
			(0.007)	(0.007)
State-fixed effect?	Yes	Yes	Yes	Yes
Year-fixed effect?	Yes	Yes	Yes	Yes
Observations	27,192	27,192	29,384	28,070
Adjusted R^2	0.618	0.674	0.596	0.664
Note:				*p<0.1; **p<0.05; ***p<0.01

As mentioned in the theory section, dynamic demand can create a virtuous cycle in two ways; it

increases per capita income as well as employment in districts. To see whether there is supportive evidence of this, I estimate linear models where outcomes of interest are per capita income and active workforce in congressional district i respectively. These measures capture the outcomes of interest across different sectors. The main independent variable is the demand for skilled foreign workers in congressional district i. As reported in Table 4, the effects of the demand for skilled foreign workers on per capita income and the number of the active workforce are positive and statistically significant as expected. Every time the number of skilled foreign workers multiplies by 10, per capita income increases by $3,690.

Table 4

	Dependent variable:			
	Per Capita income		Active workforce	
	(1)	(2)	(3)	(4)
Demand for foreign skilled (log)	0.369^{***}	0.351^{***}	0.166^{***}	0.168^{***}
	(0.004)	(0.004)	(0.002)	(0.002)
Unemployment (log)		-1.285^{***}		0.138^{***}
		(0.021)		(0.013)
State-fixed effect?	Yes	Yes	Yes	Yes
Year-fixed effect?	Yes	Yes	Yes	Yes
Observations	29,371	29,371	28,070	28,070
Adjusted R^2	0.817	0.838	0.936	0.937
Note:				*p<0.1; **p<0.05; ***p<0.01

6.2 Analysis by bill type

The main contribution of this paper comes from the analysis of different types of bills where I link the dynamic demand in the labor market to the behaviors of politicians in regard to high-skilled immigration policymaking. I separate the two types of liberalizing high-skilled immigration bills to conduct a distinct analysis of each type of bill. I first conduct analyses on representatives' sponsoring behavior and turn to voting behavior of representatives. I further analyze the pattern of polarization in Congress with respect to bill type. Combined analyses of the two types of bills with a three-way interaction are included in Appendix A.7.

6.2.1 Expanding bills

I first focus on expanding bills to estimate the following logistic fixed effect model to test the effect of demand for high-skilled foreign workers on sponsorship (H1) and the effect of demand and partisanship (H2, H4).

$$logit(Sponsor_{i,j,t}) = \alpha_s + \alpha_y + \beta_1 \cdot logDemand_{i,t} + \beta_2 \cdot Rep_{i,j,t} + \beta_3 \cdot logDemand_{i,t} \cdot Rep_{i,j,t} + \\ + \beta_4 \cdot X_{i,t} + \epsilon_{i,t}$$

The outcome variable is sponsorship. $Sponsor_{i,j,t}$ is a binary variable that takes 1 if a representative of congressional district i sponsors a bill j at time t and 0 otherwise. $logDemand_{i,t}$ is the log of number of skilled foreign workers that firms in congressional district i demanded at time t. $Republican_{i,j,t}$ is a binary variable that takes 1 if a representative sponsoring bill j at time t in district i is Republican and 0 otherwise. $X_{i,t}$ is a vector of explanatory variables that are associated with district i at time t. I include the log of unemployment, median income, and the log of number of STEM graduates to capture the economic conditions of districts. Median household income captures the income/wealth level of congressional district i. I use the log of the number of STEM graduates, rather than the number of bachelor's degree holders, to capture the portion of the high-skilled population in district i. This better reflects the competitive dynamics between native citizens and foreign nationals, because 80% of skilled visas go to workers in STEM-related fields. I assume that STEM-degree holders will work in STEM-related fields. I include the log of the number of naturalized citizens, the log of the number of non-citizens, the log of the number of Hispanics, and African Americans to account for the composition of demographics in district i, which is considered influential in immigration policy-making (Wong, 2017). I also include the binary lobbying variable, which takes 1 if there are firms in district i that lobbied for liberalizing high-skilled immigration bills and 0 otherwise. I also include state and year fixed effects. Following Facchini and Steinhardt (2011), I use state fixed effects because the fact that redistricting occurs every ten years makes the use of district-fixed effects problematic. However, I account for redistricting and use district-fixed effects as a robust check.

The coefficients of interest are β_1, β_2 and β_3. I expect the sign of β_1 to be positive and β_2

and β_3 to be negative. Democrats are more likely to sponsor expanding bills because they are not constrained by the pressure of favoring one type of immigration at the expense of other types of immigration. Therefore, the effect of demand on representatives' sponsoring expanding bills will be positive for Democrat representatives.

Table 5 presents the results of the expanding bill analysis. Model 1 is a basic regression with the main variables of interest. Model 2 adds the interaction term between the demand and Republican variable. Model 3 adds variables related to the economic conditions of districts. Model 4 includes all the variables including the composition of demographics and lobbying. As expected, the sign of the demand for high-skilled foreign workers is positive and that of being Republican is negative throughout the models, which supports H1 and H2. The demand for high-skilled foreign workers has a significant positive effect on sponsoring an expanding bill when a representative is a Democrat, which supports H4. Figure 4 plots coefficients of the regression.

Figure 4: Coefficient plot for expanding bills

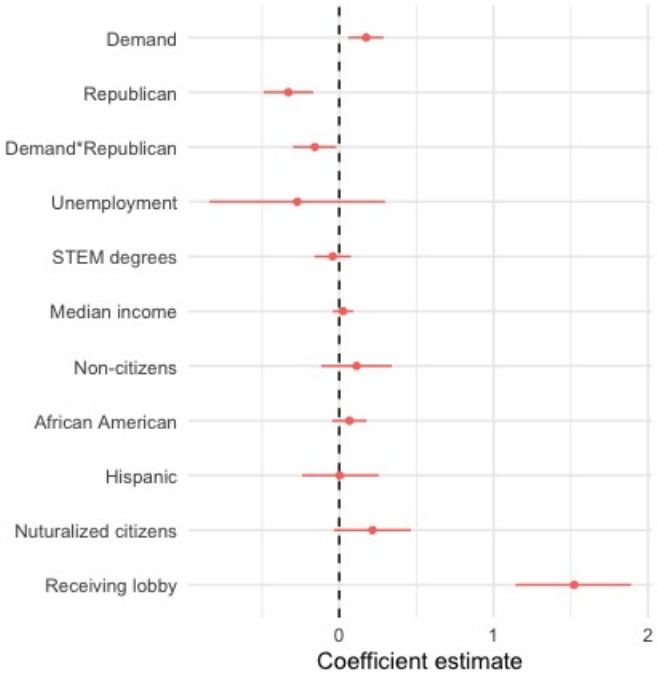


Figure 5 plots marginal effects to determine the conditions under which the effect of demand for high-skilled foreign workers is statistically significant. Figure 10a indicates the marginal effects of the demand for foreign workers on sponsoring behavior for Democrats and Republicans. The positive effect of demand for high-skilled foreign workers is statistically significant when a

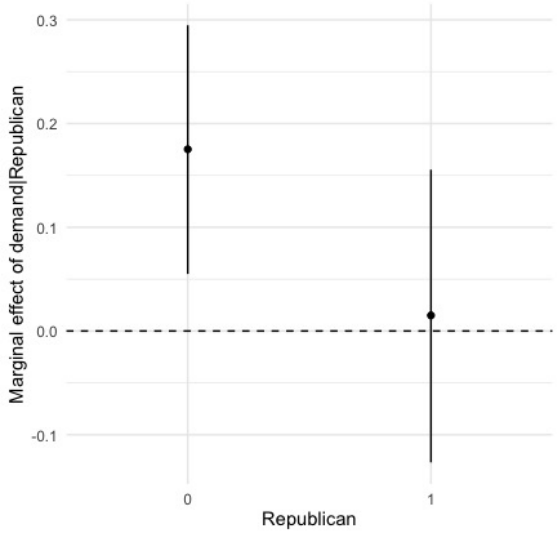
Table 5: Expanding bill analysis for sponsoring

	Sponsoring an expanding bill			
	(1)	(2)	(3)	(4)
Demand for skilled foreign (log)	0.2334***	0.2981***	0.2473***	0.1733***
	(0.0373)	(0.0419)	(0.0482)	(0.0544)
Republican	-0.3862***	-0.3618***	-0.3633***	-0.3290***
	(0.0866)	(0.0837)	(0.0932)	(0.0958)
Demand × Republican		-0.1767***	-0.1705***	-0.1583**
		(0.0612)	(0.0645)	(0.0705)
Unemployment (log)			0.1487	-0.2721
			(0.2321)	(0.2453)
STEM degrees (log)			0.0386	-0.0423
			(0.0449)	(0.0516)
Median income			0.0571*	0.0245
			(0.0293)	(0.0348)
Non citizen (log)				0.1119
				(0.1066)
African American (log)				0.0658
				(0.0613)
Hispanic (log)				0.0029
				(0.1253)
Naturalized citizens (log)				0.2153*
				(0.1107)
Receiving lobbying				1.522***
				(0.2714)
State fixed effect?	Yes	Yes	Yes	Yes
Year fixed effect?	Yes	Yes	Yes	Yes
Observations	20,603	20,603	18,441	16,693
Pseudo R^2	0.14915	0.14982	0.14622	0.16972
BIC	10,101.6	10,104.1	9,588.2	8,511.4

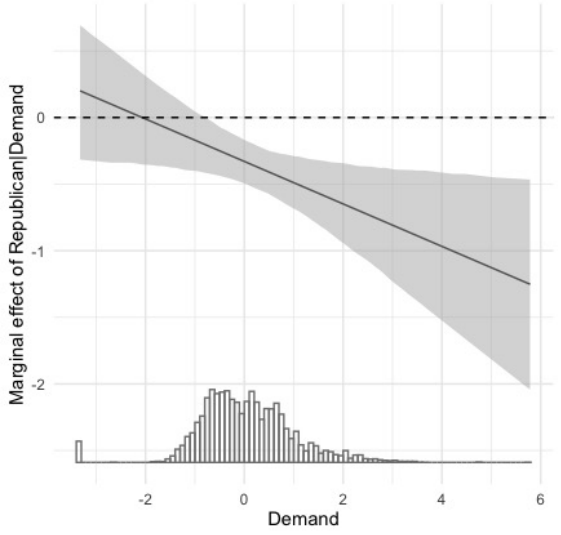
Note: *p<0.1; **p<0.05; ***p<0.01

Clustered (state) standard-errors in parentheses

Figure 5: Marginal effect plots for expanding bills



(a) Marginal effect of demand given Republican

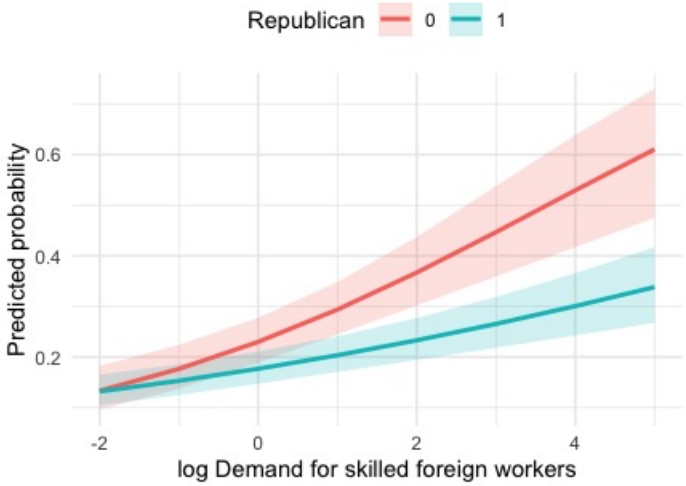


(b) Marginal effect of Republican given demand

representative is a Democrat, while for a Republican, the effect of demand is not statistically significant. Figure 10b indicates how the marginal effect of being Republican changes compared to being Democrat as the demand for high-skilled foreign workers increases. The reductive effect of being Republican strengthens as the demand for high-skilled foreign workers increases. In other words, the marginal effect of being Republican becomes more negative as the demand increases relative to Democrat representatives. At medium to high levels of demand, Republican representatives are less likely to support expanding bills. To address concerns about the limited number of observations at the high end of the demand for skilled foreign workers, I follow Hainmueller et al. (2019)'s approach and use a binning estimator as a robust check. The result is consistent across different estimation strategies.

Figure 6 plots predicted probabilities of sponsoring an expanding bill for Republican and Democratic representatives of districts in California in 2017. All other variables are at their means. The probability of sponsoring an expanding bill is 0.6 for a Democratic representative in California when there is high demand for skilled foreign workers in his or her district. The probability of sponsoring an expanding bill for a Republican representative in California is 0.3 when the district has a high demand for skilled foreign workers.

Figure 6: Predicted probabilities



6.2.2 Zero-sum bills

I estimate the same model as above using zero-sum bills to test H3 and H5. As a reminder, zero-sum bills aim to increase high-skilled immigration at the expense of other types of immigration. I expect the signs of β_1, β_2, and β_3 to be positive. Supporting high-skilled immigration at the expense of other types of immigration better aligns with the values that Republicans pursue, and the effect of demand will be positively associated with an increase in sponsoring when a representative is a Republican.

Table 6 presents the results of the zero-sum bill analysis. The effect of being Republican is positive throughout the models. As with the analysis of expanding bills, the basic model starts with main variables of interest and adds more variables to it. The effect of being Republican and the interaction effect between demand and being Republican are positive as expected. However, the demand for high-skilled foreign workers (β_1) has a significant reductive effect on a representative's sponsoring of a bill when a Democrat represents a district. This is because Democrats are not willing to sponsor zero-sum bills compared to Republicans even when they have high demands for skilled workers in their districts. Note that these results are opposite from those from the analysis of expanding bills. Figure 7 plots coefficients of the regression.

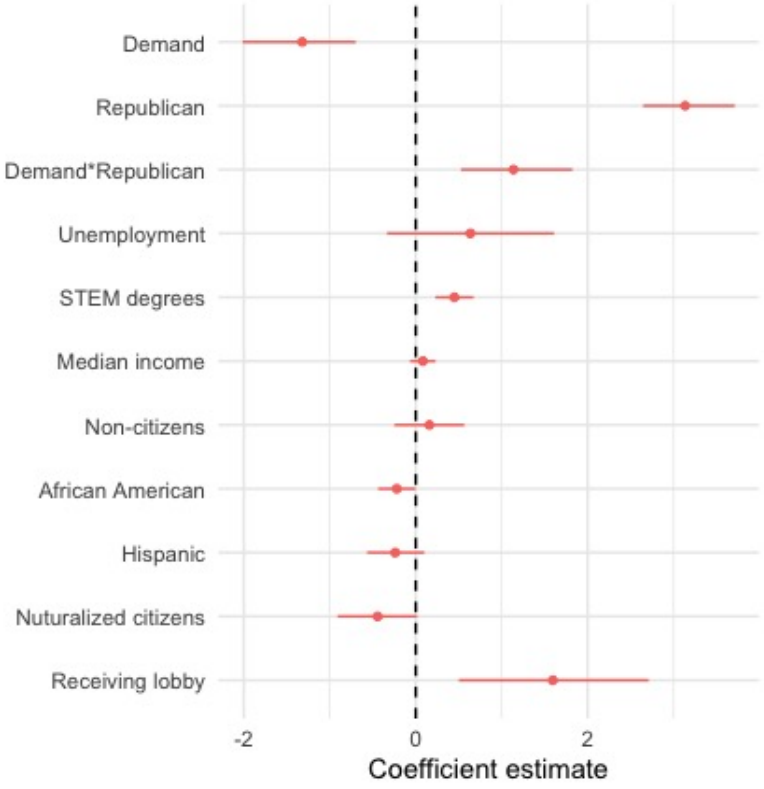
Figure 8 plots the marginal effects of the interaction term between the demand for high-skilled foreign workers and being Republican. The effect of demand for skilled foreign workers is negative for Democrats but the reductive effect of demand decreases when Republicans represent districts.

Table 6: Zero-sum bill analysis for sponsoring

	Sponsoring a zero-sum bill			
	(1)	(2)	(3)	(4)
Demand for skilled foreign (log)	-0.0052	-1.167***	-1.372***	-1.322***
	(0.0884)	(0.4438)	(0.4681)	(0.4266)
Republican	3.252***	3.384***	3.291***	3.135***
	(0.2951)	(0.2858)	(0.3079)	(0.3118)
Demand × Republican		1.218***	1.183***	1.138***
		(0.4411)	(0.4298)	(0.3900)
Unemployment (log)			-0.0415	0.6361
			(0.4519)	(0.5306)
STEM degrees (log)			0.2926	0.4486**
			(0.2172)	(0.2218)
Median income			0.0085	0.0832
			(0.0616)	(0.0665)
Non citizen (log)				0.1585
				(0.2684)
African American (log)				-0.2202*
				(0.1306)
Hispanic (log)				-0.2389
				(0.1583)
Naturalized citizen (log)				-0.4437
				(0.3192)
Receiving lobby				1.595***
				(0.4552)
State fixed effect?	Yes	Yes	Yes	Yes
Year fixed effect?	Yes	Yes	Yes	Yes
Observations	7,953	7,953	7,953	7,121
Pseudo R^2	0.26646	0.27024	0.27315	0.26883
BIC	3,376.6	3,370.6	3,385.9	3,295.5

Note: *p<0.1; **p<0.05; ***p<0.01
Clustered (state) standard-errors in parentheses

Figure 7: Coefficient plot for zero-sum bills

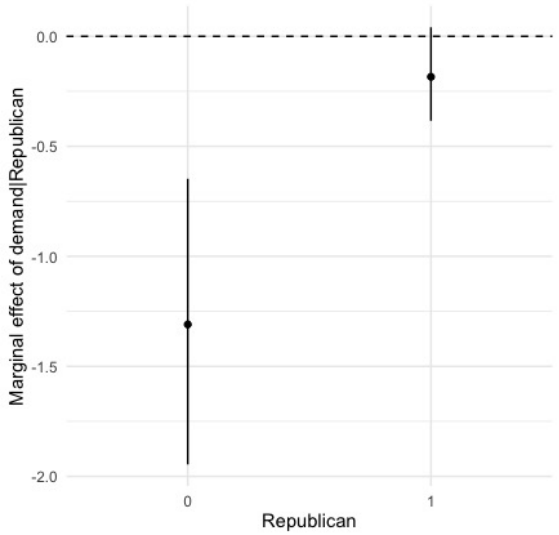


Though the coefficient of the interaction term is positive as expected, the effect of demand is negative for Republican representatives. Compared to Democratic representatives, Republicans are more likely to sponsor zero-sum bills, but in contrast to the expectation, the effect of demand is not positive for Republican representatives. The positive effect of being Republican on sponsoring zero-sum bills increases as the demand for high-skilled foreign workers increases. In other words, Republicans are more likely to sponsor zero-sum bills at medium and high levels of demand for skilled foreign workers.

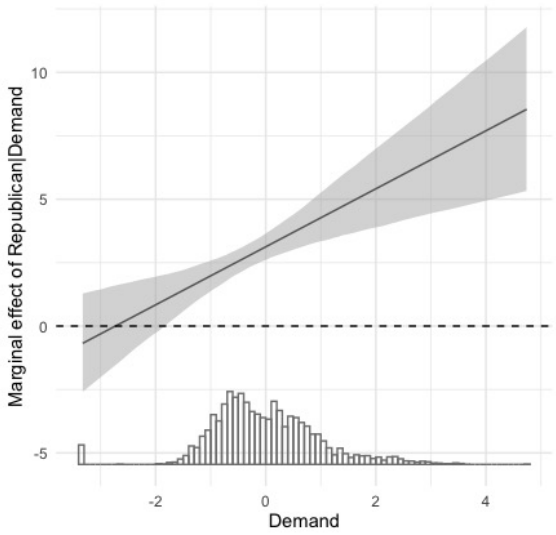
Figure 9 plots predicted probabilities of sponsoring a zero-sum bill for Republican and Democratic representatives of districts in California in 2017. All other variables are at their means. The probability of sponsoring a zero-sum bill is close to 0 for a Democratic representative in California when there is high demand for skilled foreign workers in his or her district. The probability of sponsoring a zero-sum bill for a Republican representative in California is 0.025 when the district has a high demand for skilled foreign workers.

I lastly test H6, the claim that zero-sum immigration bills are more associated with an increase

Figure 8: Marginal effect plots for zero-sum bills

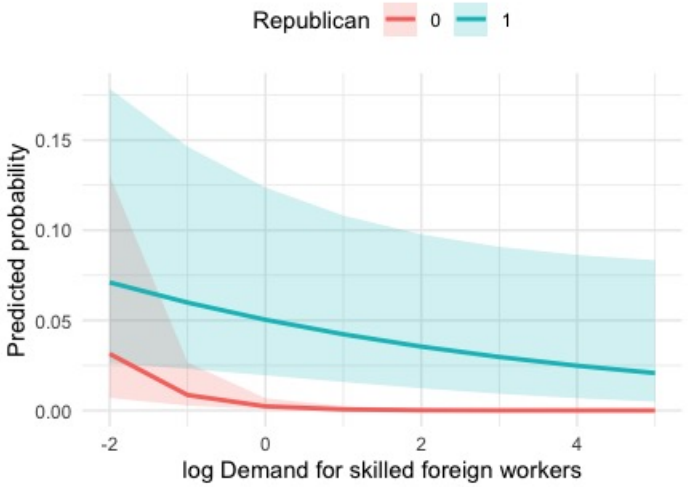


(a) Marginal effect of demand given Republican



(b) Marginal effect of Republican given demand

Figure 9: Predicted probabilities



in polarization than other types of immigration bills. I estimate a linear regression model with a president-fixed effect as below. $Polarization_{j,t}$ captures polarization of sponsoring regarding bill j at time t. For polarization, I use the same formula below used in the previous section to calculate the distance between sponsoring ratios of the two parties. Higher distance captures more polarization in sponsoring a bill in Congress. $zerosum_{j,t}$ takes 1 if bill j at time t is a zero-sum bill. $Restricting_{j,t}$ takes 1 if bill j at time t is a restricting bill. I also include $Trump_{j,t}$ that takes 1 if bill j at time t was introduced when Trump was the president.

Table 7: Zero-sum bills and polarization?

	Dependent variable:	
	distance	
	(1)	(2)
Zero-sum bill	0.054**	0.055*
	(0.025)	(0.032)
Trump		0.022
		(0.030)
Restricting bill	−0.041*	−0.041*
	(0.023)	(0.024)
Zero-sum × Trump		−0.003
		(0.050)
Constant	0.051***	0.050***
	(0.017)	(0.018)
Observations	88	88
R^2	0.123	0.123
Note:	*p<0.1; **p<0.05; ***p<0.01	

$$Polarization_{j,t} = \alpha_p + \beta_1 \cdot zerosum_{j,t} + \beta_2 \cdot Restricting_{j,t} + \epsilon_{j,t}$$

$$Distance_i = \left| \frac{Democrats\ sponsoring\ bill_i}{number\ of\ Democrats\ in\ Congress} - \frac{Republicans\ sponsoring\ bill_i}{number\ of\ Republicans\ in\ Congress} \right|$$

As demonstrated in Table 7, an increase in zero-sum bills is associated with an increase in polarization in terms of sponsoring. The interaction term between zero-sum bills and the Trump administration is not statistically significant. Restrictive bills are less likely to be associated with an increase in polarization. Most of the restrictive bills are designed to protect the jobs of native citizens by enforcing a strong visa monitoring process, which could make it easy for the two parties to reach a consensus.

6.3 Additional analysis and robust check

I estimate the same logistic model with fixed effects from Table 5 and Table 6 for roll call votes from 2003 to 2019. I include five immigration bills out of seven bills that received roll call votes as shown in Table 8. I excluded H.R.5362 (Nonimmigrant Worker Visa Fee increase) because the nature of the bill is quite mixed. It increased H-1B visa fees which could be interpreted as restrictive, but this bill was introduced with a bill in the Senate that also increased the number of H-1B visas. H.R.4818 is also excluded because this bill is part of an appropriations bill and the nature of the bill is also mixed in that it is restrictive because it significantly reduced the number of H-1B visas by a large amount (about 110,000). At the same time, however, the bill made 2,0000 additional visas available for foreign nationals who hold advanced degrees in the U.S. The detailed explanations of the bills are included in the Appendix.

Table 8: Bills that received roll call votes

Bills	Congress	Date	Topic	Bill characteristics	Result
H.R.1044	116	Feb.7.2019	Fairness for High-Skilled Immigrants Act of 2020	Open: expanding	Passed
H.R.4760	115	Jun.21.2018	Securing America's Future Act of 2018	Open: zero-sum	Failed
H.R.6136	115	Jun.27.2018	Border Security and Immigration Reform Act of 2018	Open: zero-sum	Failed
H.R.6429	112	Sep.18.2012	STEM Jobs Act of 2012	Open: zero-sum	Passed
H.R.3012	112	Sep.22.2011	Fairness for High-Skilled Immigrants Act of 2011	Open: expanding	Passed
H.R.4818	108	July.13.2003	Consolidated Appropriations Act, 2005	Mixed	Passed
H.R.5362	106	Oct.3.2000	Nonimmigrant Worker Visa Fee Increase	Mixed	Passed*

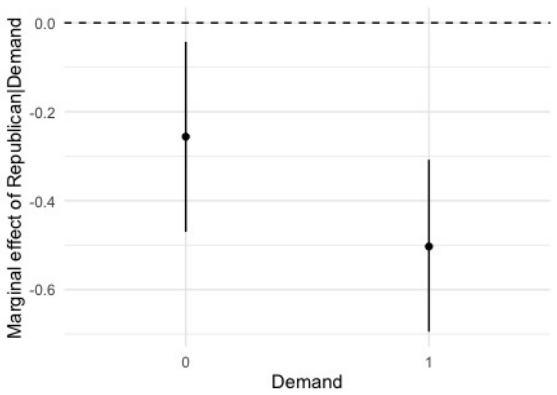
The regression results for roll call votes are similar to those for sponsoring as demonstrated in Table 9. The interaction term of expanding bills is not statistically significant although the direction is as expected. This could be due to the lack of power, as there are only two expanding bills that received roll call votes. However, the demand for skilled foreign workers and being Republican are the same as those from the sponsorship analysis.

Table 9: Roll call vote analysis

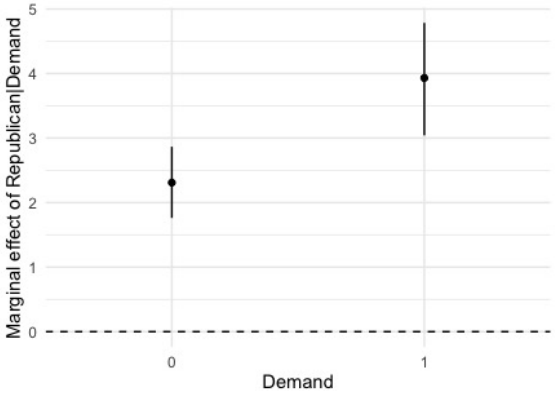
	Voting in favor of a bill	
	(1) Expanding bills	(2) Zero-sum bills
Demand for skilled foreign (log)	0.5554***	-0.8061***
	(0.1791)	(0.1659)
Republican	-2.650***	5.520***
	(0.6519)	(0.9905)
Unemployment	-0.4857***	-0.1622**
	(0.0351)	(0.0630)
STEM degrees (log)	-0.4495**	-0.0081
	(0.2164)	(0.2595)
Median income	0.4453***	0.0729
	(0.0225)	(0.0628)
Non-citizens (log)	0.1148***	0.0110
	(0.0143)	(0.0901)
Naturalized citizens (log)	0.2660	-0.0747
	(0.3279)	(0.5363)
Hispanic (log)	-0.8694	-0.3553
	(0.6561)	(0.5196)
Receiving lobby	15.25***	0.4876
	(0.0247)	(0.6632)
Demand for skilled foreign (log) × Republican	-0.3471	0.8814***
	(0.2721)	(0.1722)
Year fixed effect?	Yes	Yes
Observations	833	1,230
Pseudo R^2	0.22370	0.54732
BIC	486.27	852.47

Note: *p<0.1; **p<0.05; ***p<0.01
Clustered (state) standard-errors in parentheses

Figure 10: Marginal effect plots with a binning estimator



(a) Expanding bills: Marginal effect of being Republican given demand with 95% CIs



(b) Zero-sum bills: Marginal effect of being Republican given demand with 95% CIs

I further address concerns about a limited number of observations on the high end of the demand for skilled foreign workers in plotting the marginal effects of being Republican given the demand for expanding and zero-sum bills. I follow Hainmueller et al. (2019) and create a dummy variable that takes 1 if the demand falls above the 50% percentile and 0 otherwise. Figure 10 presents results, which are consistent with the marginal effects of being Republican given the demand without a binning estimator.

For a robust check of sponsorship analyses, I use a district-fixed effect, following Jones and Walsh (2018)'s approach that takes redistricting into account. The results are similar to previous analyses with state-fixed effects as demonstrated in Table 10. The directions and magnitudes of the variables of interest are as expected.

7 Conclusion

Analyzing high-skilled immigration bills introduced in the House of Representatives from 2003 to 2019, I find that the nature of high-skilled immigration bills has become zero-sum over time in that these bills are designed to increase high-skilled immigration at the expense of other types of immigration. Zero-sum bills are also associated with an increased level of polarization concerning high-skilled immigration.

Whereas previous studies focus on the supply side, that is, how politicians or native citizens

Table 10: Robust check for sponsorship analysis with district-fixed effects

	Dependent variable:	
	Sponsoring a bill	
	(1) Expanding bills	(2) Zero-sum bills
Demand for skilled foreign (log)	0.176^{*}	-1.066^{**}
	(0.093)	(0.507)
Republican	-0.006	2.941^{***}
	(0.131)	(0.381)
Unemployment (log)	-1.435^{***}	1.921^{**}
	(0.407)	(0.783)
STEM degrees (log)	-0.004	0.530^{**}
	(0.107)	(0.264)
Median income	0.034	0.148
	(0.039)	(0.094)
Non-citizens (log)	0.632^{***}	-0.073
	(0.220)	(0.471)
African American (log)	0.195	0.562
	(0.124)	(0.374)
Hispanic (log)	0.068	-0.415^{**}
	(0.146)	(0.207)
Naturalized citizens (log)	-0.146	-0.566
	(0.271)	(0.637)
Receiving lobby	1.666^{***}	2.757^{***}
	(0.215)	(0.921)
Demand for skilled foreign (log) $\times$ Republican	-0.274^{**}	1.125^{**}
	(0.116)	(0.496)
Observations	16,947	7,587
AIC	8,252.935	3,183.674

Note: *p<0.1; **p<0.05; ***p<0.01

react to the inflow of immigrants that supposedly make the labor market more competitive due to an increase in the supply without a change in demand, this paper argues that we should relax this assumption and accept that demand will change in response to the supply of labor. Accordingly, this paper puts forward a theory of dynamic demand in which the increase in the supply of labor increases the demand for labor, which could further increase the supply, creating a virtuous cycle in the labor market. At a broad level, this paper provides implications that high-skilled immigration is not just the inflow of people, but the inflow of knowledge and capital, which contributes to the virtuous cycle in the industry.

The effect of demand for skilled foreign workers on sponsoring is moderated by partisanship, which is also a critical factor that affects high-skilled immigration policy. This moderation effect differs depending on the immigration bill type. Democrats are more likely to support expanding bills that aim to increase the number of high-skilled immigrants because they are not constrained by the pressure of choosing one type of immigration over the other. However, Democrats are less likely to support zero-sum bills at the expense of other types of immigration even when demand for foreign workers is high in their districts. Zero-sum bills are against the value of the Democratic party and Democrats are constrained by this value even when the demand for skilled foreign workers is high. Thus, the effect of demand on sponsoring a zero-sum bill is negative and statistically significant for Democratic representatives. On the contrary, Republicans are more likely to sponsor zero-sum bills. Contrary to what I expected, Republican representatives are less sensitive to the demand for foreign workers for both types of high-skilled immigration bills. Rather, Democrats are more sensitive toward the demand for skilled foreign workers in their districts and react more favorably to expanding high-skilled immigration bills. These findings challenge the conventional wisdom that Republicans are more supportive of all types of high-skilled immigration policy due to their business-friendly nature. Though both types of bills aim to increase high-skilled immigration, support for the immigration bills differs significantly depending on partisanship. The detailed categorization of immigration bills made it possible to unveil the hidden dynamics behind high-skilled immigration policymaking.

This paper focuses on high-skilled immigration. However, the focus on demand can apply to low-skilled immigration as well. The demand for low-skilled immigration should be directly measured and taken into account in the immigration study. The setting for low-skilled immigra-

tion is not likely to be a virtuous cycle as it is for high-skilled immigration (particularly the tech sector). However, as a future study, it will provide meaningful implications if we find the same pattern regarding low-skilled immigration. By including the demand for low-skilled foreign workers in the study, we can further examine the link between high-skilled immigration and low-skilled immigration policy.

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Appendix A Appendix

A.1 Descriptive statistics

A.1.1 Sponsorship

Table 11 presents the descriptive statistics for sponsoring analysis.

Table 11: Sponsorship analysis

Variable	N	Mean	Std. Dev.	Min	Pctl. 25	Pctl. 75	Max
Sponrosring a bill	26481	0.07	0.256	0	0	0	1
Demand for skilled foreign (log)	26481	0.003	1.007	-3.325	-0.613	0.58	5.784
Republican	26481	0.507	0.5	0	0	1	1
Unemployment (log)	26263	-0.046	0.911	-2.786	-0.039	0.367	1.855
STEM degrees (log)	24071	-0.012	1.001	-3.592	-0.687	0.671	3.938
Median income	26263	3.923	2.684	0.032	0.124	5.615	12.982
Non citizens (log)	24949	0.007	0.997	-3.198	-0.721	0.815	2.235
African American (log)	24048	0.017	0.991	-3.023	-0.678	0.747	2.048
Hispanic (log)	26263	-0.05	1.038	-5.015	-0.796	0.724	1.589
Naturalized citizens (log)	24949	0.002	0.999	-3.007	-0.751	0.779	2.224
Receiving lobby	26481	0.011	0.104	0	0	0	1

A.1.2 Roll call votes

Table 12 reports the descriptive statistics for roll call vote analysis.

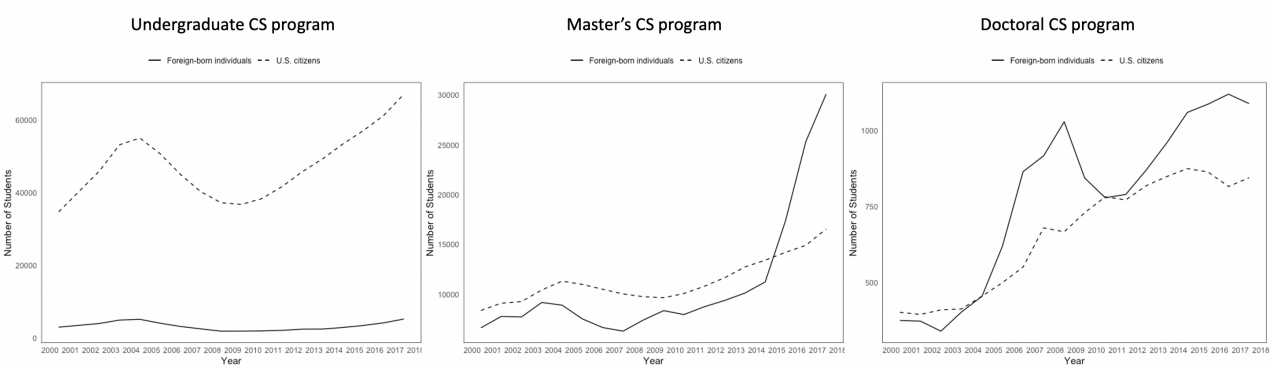
Table 12: Roll call vote analysis

Variable	N	Mean	Std. Dev.	Min	Pctl. 25	Pctl. 75	Max
Vote in favor of a bill	2067	0.635	0.481	0	0	1	1
Demand for skilled foreign (log)	2155	0	1	-2.157	-0.423	0.609	3.853
Republican	2155	0.532	0.499	0	0	1	1
Unemployment	2150	2.579	1.5	0.056	1.973	3.535	7.42
STEM degrees (log)	2150	0	1	-3.476	-0.682	0.649	3.824
Median income	2150	3.37	2.943	0.032	0.08	5.505	12.982
Non-citizens (log)	2150	0	1	-2.864	-0.732	0.819	2.024
Naturalized citizens (log)	2150	0	1	-2.864	-0.754	0.798	2.153
Hispanic (log)	2150	0	1	-4.035	-0.827	0.824	1.594
Receiving lobby	2155	0.042	0.201	0	0	0	1

A.2 STEM graduates in the U.S.

The number of college students who choose CS as their major has also been increasing, as tech jobs are thought to pay well and to have promising prospects. Whereas traditionally, there have not been many native students in CS programs, the number of native undergraduates majoring in CS has been increasing rapidly and is now higher than the number of international students. However, in master's and Ph.D. programs, the number of foreign-born students still exceeds the number of native-born students. This trend is more prominent with respect to doctoral degrees. Figure 11 shows this contrasting trend.

Figure 11: Native-born and international students in CS programs (Degrees awarded)



A.3 Demand for high-skilled foreign workers and Partisanship

I consider the demand for high-skilled foreign workers is high if companies in congressional district i applied for more than 10,000 H-1B visas for foreign nationals in time t. Table 13 is a two-by-two table for sponsorship analysis.

Table 13: 2×2 table by demand and partisanship (sponsorship)

		Republican		
		0	1	
Demand	High	759 (2.8%)	240 (0.9%)	999 (3.7%)
	Low	12,302 (46.5%)	13,180 (49.8%)	25,482 (96.3%)
		13,061 (49.3%)	13,420 (50.7%)	

The two-by-two table for the roll call vote analysis is also presented below in Table 14.

Table 14: 2×2 table by demand and partisanship (voting)

		Republican		
		0	1	
Demand	High	64 (2.9%)	15 (0.8%)	79 (3.7%)
	Low	944 (43.8%)	1132 (52.5%)	2,076 (96.3%)
		13,061 (46.7%)	13,420 (53.3%)	

A.4 High-skilled immigration bills

High-skilled immigration bills included in the analyses in the main text are presented in Table 15.

Table 15: High-skilled immigration bills included in analyses

Congress	Bill	Title	Type
116	HR1044	Fairness for High-Skilled Immigrants Act of 2020	expanding
116	HR3564	Fairness for High-Skilled Americans Act of 2019	restricting
116	HR6993	H–1B and L–1 Visa Reform Act of 2020	restricting
116	HR8477	American Jobs First Act of 2020	zero-sum
116	HR8838	Legal Immigration for the U.S. Act	zero-sum
116	HR4623	Keep STEM Talent Act of 2019	expanding
116	HR479	Eliminate the diversity immigrant program	zero-sum
116	HR5327	Resolving Extended Limbo for Immigrant Employees and Families Act	expanding
115	HR4760	Securing America's Future Act of 2018	zero-sum
115	HR6136	Border Security and Immigration Reform Act of 2018	zero-sum
115	HR1303	H-1B and L-1 Visa Reform Act of 2017	restricting
115	HR170	Protect and Grow American Jobs Act	restricting
115	HR1705	Keeping American Jobs Act	restricting
115	HR2717	STAPLE Act	expanding
115	HR392	Fairness for High-Skilled Immigrants Act of 2017	expanding
115	HR670	High-Skilled Integrity and Fairness Act of 2017	expanding
115	HR1129	Student Visa Security Improvement Act	restricting
115	HR1178	SAFE for America Act	restricting
115	HR2106	Partner with Korea Act	expanding
115	HR2233	American Jobs First Act of 2017	zero-sum
115	HR2577	Jobs in America Act	expanding
115	HR3647	Save America Comprehensive Immigration Act of 2017	expanding
115	HR3775	Immigration in the National Interest Act of 2017	zero-sum
115	HR4427	Protecting America and American Workers Act	zero-sum

Table 15: High-skilled immigration bills included in analyses

Congress	Bill	Title	Type
114	HR213	Fairness for High-Skilled Immigrants Act of 2015	expanding
114	HR5398	Immigration for a Competitive America Act of 2016	expanding
114	HR5657	H-1B and L-1 Visa Reform Act of 2016	restricting
114	HR2181		expanding
114	HR4598	American Jobs First Act of 2016	zero-sum
114	HR5801		restricting
114	HR1019		expanding
114	HR2278		zero-sum
114	HR3987		expanding
113	HR2131	SKILLS Visa Act	expanding
113	HR459	STEM Visa Act of 2013	zero-sum
113	HR633	Fairness for High-Skilled Immigrants Act of 2013	expanding
113	HR5520		zero-sum
113	HR1227		expanding
113	HR1812		expanding
112	HR3012	Fairness for High-Skilled Immigrants Act of 2011	expanding
112	HR6429	STEM Jobs Act of 2012	zero-sum
112	HR1114	StartUp Visa Act of 2011	expanding
112	HR3146	American Innovation and Education Act of 2011	expanding
112	HR6210	American Investment and Job Creation Act of 2012	expanding
112	HR6412	Attracting the Best and Brightest Act of 2012	expanding
112	HR2161	IDEA Act of 2011	expanding
112	HR2952	Immigration Backlog Reduction Act of 2011	expanding
112	HR43		zero-sum
112	HR704		zero-sum
111	HR5658	Securing Knowledge, Innovation, and Leadership Act of 2010	expanding
111	HR5397	H-1B and L-1 Visa Reform Act of 2010	restricting
111	HR1791		expanding
111	HR5193	StartUp Visa Act of 2010	expanding
111	HR2305		zero-sum
111	HR264	Save America Comprehensive Immigration Act of 2009	expanding
111	HR3532	Accept Chinese Talent Now Act	expanding
111	HR3687		zero-sum

Table 15: High-skilled immigration bills included in analyses

Congress	Bill	Title	Type
110	HR1645	Security Through Regularized Immigration and a Vibrant Economy Act of 2007	expanding
110	HR1758		expanding
110	HR1930	Securing Knowledge, Innovation, and Leadership Act of 2007	expanding
110	HR5630	Innovation Employment Act	expanding
110	HR5634	New American Innovators Act	expanding
110	HR5882	To recapture employment-based immigrant visas	expanding
110	HR6039		expanding
110	HR7184		expanding
110	HR5642	Strengthening United States Technology And Innovation Now Act	expanding
110	HR4910	Citizenship Processing Backlog Reduction Act of 2007	expanding
110	HR3828	Citizenship and Immigration Backlog Reduction Act	expanding
110	HR750	Save America Comprehensive Immigration Act of 2007	expanding
110	HR2504	L-1 Nonimmigrant Reform Act	restricting
110	HR1430		zero-sum
109	HR3322	USA Jobs Protection Act of 2005	restricting
109	HR5744	Securing Knowledge, Innovation, and Leadership Act of 2006	expanding
109	HR257	Comprehensive Immigration Fairness Act	expanding
109	HR3381		restricting
109	HR1325		restricting
108	HR2688		restricting
108	HR2849	USA Jobs Protection Act of 2003	restricting
108	HR4415	Save American Jobs Through L Visa Reform Act of 2004	restricting
108	HR4818	Consolidated Appropriations Act, 2005	restricting
108	HR4885		expanding
108	HR4166	American Workforce Improvement and Jobs Protection Act	expanding
108	HR3918	Comprehensive Immigration Fairness Reform Act of 2004	expanding
108	HR5413		restricting
108	HR3522	SAFER Act of 2003	restricting
108	HR946	Mass Immigration Reduction Act of 2003	restricting

A.5 Roll call votes

I briefly discuss the bills included in the roll call vote analysis. The Fairness for High-Skilled Immigrants Act (H.R.3012, H.R.1044) aimed to eliminate the per-country numerical limitation for employment-based immigrants such as H-1B visa holders to reduce the backlogs in the process. This bill was designed specifically to help Indian workers because the number of Indian workers has far exceeded the numerical cap for green cards. Often, Indian nationals working in the U.S. need to wait more than 50 years to get green cards. It takes even longer for their family who is still in India. This bill is controversial because it does not benefit foreign nationals from other small countries, since they would need to wait a long time for green cards if the per-country cap were eliminated.

The Securing America's Future Act of 2018 (H.R.4760), Border Security and Immigration Reform Act of 2018 (H.R.6429), and The STEM Jobs Act of 2012 (H.R.6429) are zero-sum in that it aimed to increase high-skilled immigration at the expense of eliminating the diversity visa program. The Border Security and Immigration Reform Act of 2018 (HR6136) was introduced to strengthen restrictive measures regarding immigration. The overall stance of this bill is restrictive but favorable to highly skilled immigrants. This bill makes it difficult for junior high-skilled foreign nationals to obtain H-1B visas but easier for senior-level foreign nationals who receive higher wages than junior foreign workers and native citizens.

A.6 STEM population and the demand for skilled foreign workers

I estimate a linear model with state and year fixed effects to see if there is evidence of the dynamic demand that creates a virtuous cycle in the labor market. The dependent variable is the demand for skilled foreign workers in district i at time t. The independent variable is the log of the STEM population in district i at time $t-1$.

I assume that STEM-degree holders will work in STEM-related fields. I also include the number of non-citizens and unemployment in district i at time $t-1$. The number of STEM workers in the previous year is positively associated with the current demand for foreign workers as shown in Table 16. Replacing the STEM population with bachelor's degree holders produces the same result.

A.7 Combined bills

I combine all the liberalizing bills (expanding and zero-sum bills) to estimate the following logistic fixed effect model with a three-way interaction term. I add the zero-sum variable, a binary variable that takes 1 if bill j at time t is a zero-sum bill and 0 otherwise, and a three-way interaction term among a zero-sum bill, demand for skilled foreign workers, and being Republican. I use state and year fixed effects.

$$logit(Sponsor_{i,j,t}) = \alpha_s + \alpha_y + \beta_1 \cdot zerosum_{i,t} + \beta_2 \cdot Rep_{i,j,t} + \beta_3 \cdot Demand_{i,j,t} +$$
$$\beta_4 \cdot zerosum_{j,t} \cdot Rep_{i,j,t} \cdot Demand_{i,j,t} + \beta_5 \cdot X_{i,t} + \epsilon_{i,t}$$

The coefficient β_4 is the main variable of interest. I expect the sign of β_4 to be positive and statistically significant because I expect the interaction between demand and being Republican is positive when zero-sum bills are present. Given that we have opposing effects of demand and being Republican depending on the bill type, the effects of other variables will be driven by bill

Table 16: Skilled population and demand for skilled foreign workers

	Dependent variable:			
	Demand for skilled workers (t)			
	(1)	(2)	(3)	(4)
STEM population (t-1)	0.619***	0.521***		
	(0.004)	(0.004)		
Non-citizens (t-1)		0.392***		0.409***
		(0.006)		(0.006)
Unemployment (t-1)		−0.119***		0.038
		(0.027)		(0.026)
Bachelor's degree (t-1)			0.981***	0.834***
			(0.007)	(0.007)
State-fixed effect?	Yes	Yes	Yes	Yes
Year-fixed effect?	Yes	Yes	Yes	Yes
Observations	27,192	27,192	29,384	28,070
Adjusted R^2	0.618	0.674	0.596	0.664
Note:				*p<0.1; **p<0.05; ***p<0.01

type that takes a larger portion of the dataset. More expanding bills are in the dataset than zero-sum bills and the combined analysis will be similar to the analysis of the expanding bills.

Table 17 presents the regression results. The zero-sum bills have a significant reductive effect when Democrats represent districts, meaning that Democrats are less likely to support zero-sum bills. However, the effect of zero-sum bills becomes positive as Republicans represent districts. Figure 12 plots the marginal effects of the three-way interaction term. For expanding bills, Democrats are more likely to sponsor a bill as the demand for skilled foreign workers increases, whereas they are less likely to do so for zero-sum bills. For zero-sum bills, Republicans are more likely to sponsor the bills as the demand for skilled foreign workers increases. But Republicans tend to sponsor expanding bills as the demand for foreign workers increases.

Table 17: Sponsorship analysis with a three-way interaction term

	Sponsoring a liberalizing bill
	(1)
Zero-sum bill	-3.186***
	(0.3171)
Republican	-0.3833***
	(0.1120)
Demand for skilled foreign (log)	0.1720***
	(0.0557)
Unemployment (log)	0.2781
	(0.2441)
STEM degrees (log)	0.0660
	(0.0580)
Median income	0.0172
	(0.0308)
Non citizen (log)	0.1327
	(0.1043)
African American (log)	-0.0009
	(0.0509)
Hispanic (log)	-0.1032
	(0.0930)
Naturalized citizens (log)	0.1262
	(0.1182)
Receiving lobby	1.394***
	(0.2560)
Zero-sum × Republican	3.925***
	(0.2975)
Zero-sum × Demand for skilled foreign (log)	-1.594***
	(0.4883)
Republican × Demand for skilled foreign (log)	-0.1782**
	(0.0720)
Zero-sum × Republican × Demand for skilled foreign (log)	1.485***
	(0.4754)
State fixed effect?	Yes
Year fixed effect?	Yes
Observations	24,166
Pseudo R^2	0.16
BIC	11,916.0
Note:	*p<0.1; **p<0.05; ***p<0.01
Clustered (state) standard-errors in parentheses	

Figure 12: Marginal effect plot for sponsorship