Workers Without Borders?

Culture and the Political Economy of Temporary versus Permanent Immigration*

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*For comments and discussions we are grateful to two anonymous referees, V. Bhaskar, Emily Blanchard, Michael Clemens, Guido Friebel, Francesco Giovannoni, Oleg Itskhoki, Devesh Kapur, Wilhelm Kohler, Rod Ludema, Anna Maria Mayda, John McLaren, Giovanni Peri, Lant Pritchett, Imran Rasul, and Dani Rodrik. We also wish to thank the editor, Bob Staiger, and two anonymous referees for comments and suggestions that substantially improved the paper. We are also grateful for the comments and suggestions of seminar participants at Virginia, Munich, Maryland, William and Mary, Tuebingen, Royal Holloway, Bath, Georgetown, George Washington, the joint LSE-UCL seminar, City University London, and Cambridge, and at the southeast Asia meeting of the Econometric Society, the CESifo area conference on Global Economy, the NEUDC annual conference, the Comparative Development conference at ISI Delhi, the American Economic Association annual meetings, the Political Economics workshop at Cambridge University, the Brunel CEDI workshop, the IZA Migration workshop in Bonn, the Migration and Development workshop at the PSE, and the EUDN annual meetings. Jain thanks the Bankard Fund for Political Economy, and Majumdar thanks SSHRC for financial support. All remaining errors are our own.

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Abstract

This paper examines the role of cultural factors in driving the politics, size and nature (temporary versus permanent migration) of migration policy. We demonstrate that there exists a broad *political* failure that results in inefficiently high barriers restricting the import of temporary foreign workers, while admitting an inefficiently large number of permanent migrants, to fill a labor shortage. Strikingly, we show that countries that are poor at cultural assimilation may be better positioned to take advantage of temporary foreign worker programs than more culturally diverse and tolerant countries. In some circumstances, relaxing restrictions on the mobility of temporary migrant workers across employers has the potential to raise host country welfare, even though it increases migrant wages and lowers individual firms' profits. We also demonstrate the existence of multiple equilibria: some countries have mostly temporary migration programs and see a low degree of cultural assimilation by migrants, while other countries rely more on permanent migrants and see much more assimilation.

Keywords: International migration, political economy, political failure, culture, assimilation, multiple equilibria.

JEL Classification Codes: D72; F22; J61.

1 Introduction

The single international policy reform that will, arguably, yield the largest welfare gains, is an easing of restrictions on international worker mobility.[1] Nevertheless, despite these potentially large gains, high barriers to international labor mobility remain in place, due to political resistance arising from a potent brew of cultural and economic factors. Indeed, given this political resistance to (especially) permanent immigration, Kremer and Watt (2009), Rodrik (2002), Pritchett (2006) and Freeman (2006) have advocated programs that encourage temporary migration. Accordingly, in this paper we take a first step in analyzing the role of cultural factors in influencing the politics of temporary versus permanent worker migration.

Our contributions are three-fold. First, we develop a simple conceptual framework that assigns cultural factors a central role in driving the politics of migration policy. This allows us to examine the impact of culture on the political trade-off between temporary *and* permanent migration. In doing so we demonstrate the existence of a broad political failure with regard to migration policy. In particular, we show that this inefficiency manifests itself very differently across temporary and permanent migration – in the face of labor shortage, there is too little temporary migration and possibly inefficiently high permanent migration. Even taken together, it may result in not all productive opportunities getting filled, especially when the intertemporal control of politicians is difficult. Second, our framework throws light on the optimal design of politically feasible migration policies. For instance, many temporary migration programs require the tying of the migrant worker to a specific employer. Our framework suggests that while such tying is optimal (from the host country's perspective) for a broad set of parameters, there are circumstances under which some relaxation in the ability of temporary migrant workers to move across employers can help increase the politically feasible level of temporary migration programs and can be Pareto-improving. Finally, the paper helps account for the diversity of experience with migration and cultural assimilation. For instance, cultural assimilation is high and most of the migration in the U.S. is permanent, in contrast with Europe (Huntington, 2004; Waters and Jiminez, 2005). Once the migrant's cultural assimilation decisions are endogenized and linked with migration policy, we demonstrate that such multiple equilibria can easily arise.

Our focus on the cultural underpinnings of the political resistance to migration is deliberate.

[1] For instance, Walmsley and Winters (2003) estimate that a 3% increase in labor migration would result in half the gains associated with complete trade liberalization, and Klein and Ventura (2006) suggest that the removal of all barriers to migration between OECD and non-OECD countries would boost world output between 92 and 172%.

Much of the migration literature has focused on its economic and distributional consequences (see Ottaviano and Peri (2008), Facchini and Mayda (2009) and Hanson (2010) for a survey).However, such distributional effects are not unique to labor: they also occur with the increased movement of goods and capital. Accordingly, we emphasize the distinctive aspect of the politics of migration – namely that it has the potential to affect a country's *culture* and identity. The importance of culture has been emphasized by a nascent empirical literature. For instance, Pritchett (2006) argues that "Of all the ideas that limit migration perhaps the most important is the idea that there is a national 'culture' and that increased labor mobility threatens that culture".[2] Similarly, Card, Dustmann and Preston (2009) provide evidence to argue that cultural factors are far more important than economic factors in driving the hostility towards migrants.[3] Accordingly, we give voters' concerns about culture and national identity a central place in our framework.

We incorporate these cultural concerns in a simple dynamic political economy framework where this tension between the income gain from greater migration and the associated cultural cost is explored.[4] Our framework possesses two key features. First, the objectives of employers/firms and the country's citizens are only partially aligned. While both firms and citizens benefit from having temporary workers fill any shortage in labor, the firms would prefer to retain the more productive, experienced workers for the long run, even if by doing so they become permanent residents. In contrast, citizens worry about the costs of having culturally very dissimilar migrants, especially if there is the prospect of them becoming permanent citizens. Second, government policymaking in our framework can be influenced both by firms (through lobbying) and by citizens (via elections).[5] Under these conditions we demonstrate that there exists a broad *political* failure with regard to migration policy. In particular, countries let in not only an inefficiently *small* number of *temporary* migrants but also an inefficiently *large* number of *permanent* migrants to fill the labor shortage.

So why this political failure? It arises from the citizen-voter's recognition of a lack of inter-temporal control over the elected government's future migration policy. Citizens recognize that, once these (ostensibly) temporary workers are admitted, firms which employ such workers will have

[2] Similarly, according to Freeman (2006), "...public opinion and national policies toward immigration seem to rest on issues well beyond gains and losses in the labor market. Some natives worry that immigrants will present a cultural threat to their way of life and reduce social cohesion".

[3] They argue that hostility towards immigration is driven by 'compositional externalities' (i.e. culture, religion and ethnicity) associated with immigration, and suggest that such cultural factors are three to five times more important than economic factors in driving hostility towards immigration.

[4] The dynamic structure of the model shares many features with Coate and Morris (1999).

[5] In a common agency framework, Facchini and Willmann (2005) examine how government policymaking with respect to factor mobility is affected by citizens' concerns as well as campaign contributions.

an incentive to lobby to retain them and make them permanent. Citizen-voters are well aware of the government's vulnerability to the lobbying efforts of the firms, and also realize that the larger the size of the temporary migrant workforce, the more vigorous the lobbying efforts are likely to be. Accordingly, an endogenous *threshold* emerges, with citizen-voters restricting the number of temporary migrants to a level such that these efforts at lobbying remain ineffective. It is worth observing that these inefficiencies have little to do with the distributional impact of immigration, nor any administrative costs of admitting or repatriating temporary workers. Rather, the failure to implement immigration policies that are 'potentially Pareto improving', in the terminology of Besley and Coate (1998), is solely due to the competing political interests of firms and citizens.

Our analysis provides insights into the nature of practical policy design. Temporary worker migration programs in most countries typically require the 'tying' of guest workers with specific employers (see Table 1 for details on such programs). The question of practical policy interest is whether this employer-guest worker 'tying' is in the interest of the *host* country. At first glance the answer seems a straightforward yes – after all, when the mobility of the migrant worker is limited, the domestic firm can pay lower wages to that worker and thus extract a higher profit. However, our analysis shows that once firms' lobbying incentives are accounted for, such an inference can be incomplete. This is because restricted mobility has two effects. On the one hand lower mobility across firms results in lower wages and higher profits for the firm - the profit effect. On the other hand, lower labor mobility also enhances the firms' incentives to invest in the worker and boosts its lobbying efforts for retaining the worker by naturalizing him – the incentive effect. We demonstrate that weakening the extent of 'tying' of the migrant worker to the firm not only strengthens the migrant worker's bargaining position, but in some circumstances can also, somewhat unexpectedly, benefit the host country's overall welfare. This is because greater labor market flexibility weakens the incentive effect and allows the country to politically sustain a higher level of temporary migration.

Our second comparative static analysis demonstrates a surprising result. It suggests that countries which are particularly averse to migrants, or where socio-cultural assimilation of foreign workers is difficult, may find it easier to sustain high levels of temporary migration. The reason is that it is politically very costly for the government to let temporary migrants stay on in such countries. This raises the politically sustainable level of temporary labor migration, thereby reducing overall inefficiency. From a policy perspective, this suggests that it may be easier to politically sustain a temporary migration program involving foreign workers who find it harder to assimilate. Indeed, this finding resonates with the experience of some of the largest guest-worker programs

in the world, those in the Arabian Gulf states. In addition to a large increase in the size of their migrant workforce, there has been a dramatic shift in the source countries, with relatively easy-to-assimilate Arab workers from Jordan and Egypt being replaced by culturally very dissimilar migrant workers from India and the Philippines (Jureidini, 2006).

Countries differ in their ability to culturally assimilate foreign migrants. For instance, countries such as the U.S. have arguably been more successful in assimilating their migrants than many countries in Europe. Are these differences simply an accident of history, or are they due to differences in fundamentals, such as the degree of xenophobia? Furthermore, can the nature of migration policy itself influence (and be linked with) the migrants' incentives to culturally assimilate? These questions have been contentious and remain the subject of considerable debate.[6] A natural extension of our framework, where we endogenize the migrant's cultural assimilation decision, allows us to explore these issues. We show that there may be multiple equilibria, with countries having similar fundamentals being stuck in very different migration regimes, and being more or less successful with cultural assimilation by their migrants. Some countries rely mainly on temporary migration programs (with the scope for being made permanent being very low), and see a relatively poor degree of assimilation by the migrants. In contrast, other countries are good at assimilation, and have temporary migration programs that are a stepping-stone towards (largely) permanent migration. This multiplicity is generated by the impact of migration regimes on the migrants' assimilation decision on the one hand, and the influence of assimilation by migrants in the native culture on the natives' choice of migration policy on the other. The precise equilibrium that a country finds itself in could be a result of its history with migrants in the past.

Related Literature: As mentioned above, most of the large literature on the politics of international migration policy has focused on its distributional consequences (see Hanson (2010) for a survey). Typically, using either the framework of a median voter or of competing pressure groups, the focus has been on analyzing political forces stemming from a heterogeneity in the population. Such heterogeneity could be with respect to various economic factors such as skill levels, age (affecting productivity), capital ownership etc. The implications of such politics on migration policies have been studied in several important dimensions such as the number of migrants admitted (e.g. Ortega

[6] On the one hand, scholars such as Huntington (2004) have raised concerns about the scale of permanent migration, worried that "the single most immediate and serious challenge to America's traditional identity comes from the immense and continuing immigration from Latin America". In contrast, others such as Rodriguez (2007) believe that temporary migration programs "compromise our ability to integrate immigrants effectively into the American body politic".

(2005), Epstein and Nitzan (2006)), the enforcement of policies against illegal immigration (e.g. Facchini and Testa, 2011), the relation with the pension system (e.g. Scholten and Thum, 1996) etc.[7] However, there has been virtually no formal analysis of the implications of cultural concerns as a determinant of migration policy. Our framework brings together the political pressures exerted both by voters (who are concerned about the cultural impact of migrants) and by firm-lobbies (who are not) in the determination of immigration policy.[8]

Card, Dustmann and Preston (2009), Mayda (2006) and O'Rourke and Sinnott (2006) find, in surveys of attitudes towards immigrants, that non-economic factors such as the perceived crime and cultural impact of migrants play a significant role in determining these attitudes. As our framework shows, the explicit consideration of cultural issues is also related to the issue of temporary versus permanent migration – an important aspect of migration policy that has not received much attention in the previous literature.

The importance of accounting for issues of cultural assimilation in deciding the cultural composition of the immigration pool was systematically made first by Lazear (1999). In addition to papers cited earlier, Ottaviano and Peri (2006), Epstein and Gang (2010) and Konya (2007) have explored aspects of culture in the process of immigration, such as cultural assimilation by migrants, its interaction with the decision to migrate in the first place etc. However all of these papers take immigration policy as given. Our focus is on the analysis of how the immigration regime (governing temporary versus permanent migration) itself may be shaped by the extent of the migrants' cultural assimilation. In a recent paper, Giordani and Ruta (2012) also study the two-way interaction between immigration policy and another facet of migrant workers' decisions, namely the decision to migrate.

The rest of the paper is organized as follows. We describe the model in Section 2 and analyze the equilibrium in Section 3. Other implications of the model are discussed in Section 4 and Section 5 concludes.

2 The Benchmark Model

Labor migration affects the domestic labor market, the host country culture and its politics. The framework that we develop aims to capture these interactions in a dynamic framework. However,

[7] For a systematic analysis of the political economy of immigration, also see Facchini and Mayda (2009), Razin, Sadka and Suwankiri (2009), Facchini and Willmann (2005) and Dolmas and Huffman (2004).

[8] Facchini et al. (2011) find evidence for the US that interest groups play a significant role in influencing migration policy across sectors.

having all of these features necessitates that we include them in the most parsimonious way, and eliminate all that is not essential. With this caveat, we now describe the model.

2.1 Production and the Labor Market

Consider an infinite period economy with f production opportunities at the beginning of the game, the implementation of each of which requires one worker. For simplicity, we think of each of these production opportunities as occurring in separate firms. The country has a population comprised of i_N (native) citizen-workers, with the crucial assumption that $i_N < f$ i.e. there is a shortage of qualified native workers. Thus the employment of foreign workers is necessary to prevent some productive opportunities being wasted. Given this shortage of labor, economic output would be maximized if the country were to admit $v = f - i_N$ migrant workers to fill up the unutilized production opportunities. These migrant workers can be brought in on a temporary or permanent basis. Temporary migrant workers are to be repatriated at the end of their working stint (assumed to be one period), while permanent workers can stay indefinitely. This difference in the length of time that temporary and permanent workers can work in the host country affects their productivity, their degree of mobility across firms as well as their cultural impact. We elaborate on these distinctions below.

Wages and Productivity of Migrant Workers: We begin by observing that foreign workers are likely to take time to adjust to their new work and cultural environment. Furthermore, this process of worker learning and increased productivity can be augmented by the decision of firms to invest in worker training and development. To incorporate these effects, we divide each time period into two phases or sub-periods.

We assume that the productivity of a foreign worker in the *initial* phase (or sub-period) that he comes to the country is y,[9] and he is paid an initial migrant wage w_0. This wage is the minimum required to attract a migrant worker, and comprises of the (low) wage in the 'source' country plus a 'moving cost'.[10] We assume that the initial migrant wage is much smaller than his productivity

[9] We are thus assuming constant returns to scale in our production technology in the host country. An appealing aspect of our formulation is that it allows us to sidestep the issue of whether migration displaces native workers and adversely affects wages, and thus simplifies the analysis. Furthermore, this accords with results in most of the studies in the empirical literature on immigration that suggest that the displacement and wage effects of immigration are very small (see Kerr and Kerr, 2011 for a survey).

[10] For example, if the productivity of the worker in the source country was also given by a constant returns technology y_S, his wage there would be y_S, and w_0 would be given by $y_S + d$ where d represents the cost of worker displacement across countries. More generally, this initial expenditure on the migrant worker could also include

i.e. $w_0 < y$.[11] During this initial phase, if the firm incurs training costs of $t(e)$, the productivity of the worker in the *interim* phase (i.e. the next sub-period) increases to $y(1+\Delta(\tau+\alpha e))$ where $t(e)$ is assumed to be differentiable, increasing and convex in e, with $t(0) = 0, t'(0) = 0$. Part of this increase in productivity (i.e. $\Delta\alpha e$) is due to the deliberate investment e by the firm in boosting the worker's productivity, whose effect also depends on the parameter α, which can be used to capture the importance of employer-provided training - which can vary across industries or jobs. The rest of the productivity increase (i.e. $\Delta\tau$) could be a result of the migrant becoming familiar with the work environment in the new country.[12] This overall increase in worker productivity can have both a firm-specific component as well as a general component. We account for this by decomposing Δ into the *firm-specific* component s and the *general* component g so that $\Delta = s + g$. Therefore, if new migrant workers occupy the v job vacancies, it results in an "immigration surplus" equalling vy or $vy(1 + \Delta(\tau + \alpha e))$, minus the corresponding wage and the training costs, for the initial sub-period and the next (interim) sub-period, respectively.

We have described above how the productivity of a new migrant (temporary or permanent) increases over the course of his first period of stay in the country. There can be a further increase in the worker's productivity if he stays on beyond the first period, as is the case with permanent

any search and hiring costs incurred by the firm in locating and hiring such workers. We should point out that the literature typically either (a) assumes that migrants earn a (exogenously given) fraction of native wages, or (b) uses exogenous 'migration costs' to equilibrate wage gaps between the developing and developed world (see Borjas, 1994 for an overview), or (c) as in the rural-urban migration literature (see Stiglitz, 1976), invokes an efficiency wage argument to account for a wage premium being paid in developed country wages.

[11] Dustmann (2000) argues that "...seasonal workers from Eastern European to Western European countries are willing to accept job and wage packages which are not acceptable for natives ...The relatively low wage in their home countries, and the temporary nature of their migration reduces their reservation wages, and induces them to work harder while being abroad". Bauer, Lofstrom and Zimmerman (2000) report that "For guest workers, the existing studies suggest an initial earnings gap to natives, which range between 9 and 23 percent". Similar findings have been echoed by Anderson, Ruhs, Rogaly and Spencer (2006) in their study of migrant workers in Britain. The spate of lawsuits in the United States alleging discrimination suggest that migrant workers are underpaid relative to natives of similar productivity (for example, see the story carried by *Businessweek* at http://www.businessweek.com/magazine/content/08_06/*b*4070057782750.*htm*).

[12] A substantial body of empirical evidence suggests that wages and productivity of migrant workers increase with time spent in the country. Kerr and Kerr (2011) summarize the literature on earnings assimilation and argue that "beyond the levels of earnings gaps at entry, most studies agree that the earnings gap diminishes with time spent in the host country. Earnings assimilation happens as immigrants improve their language skills or obtain more education (e.g. Chiswick, 1991; Borjas, 1994). There are several studies on the linguistic adjustment of immigrants including the important work of Dustmann (1994), Dustmann and Soest (2002) for Europe." These findings are echoed for the U.S. by Lubotsky (2007), who suggests that wages rise with time spent in the country.

migrants. This could be either due to his increased experience or due to his access to a wider range of job-portfolios (say positions in mid or upper management) that his permanent status may make feasible. Accordingly we assume that if the worker stays on, then from the second period onwards, his productivity in each sub-period is $y(1 + \Delta(1 + \tau + \alpha e))$. Thus there is a further increase in productivity of Δ. The framework here is quite flexible in the sense that the parameters Δ and τ can be varied to study the impact of intertemporal increases in productivity for permanent and temporary migrants, while the parameter α can be varied to capture the different degrees to which productivity is affected by employer-supported training across different jobs.

Labor Market Institutions and the Mobility of Migrant Workers: While migrant productivity increases over time, there may be legal or communication barriers or frictions arising from the prevailing labor market institutions in the host country that may limit the inter-firm mobility of these migrant workers. Furthermore, these barriers, especially the legal ones, may differ by whether the worker is temporary or has permanent residence status in the country. We model this mobility barrier that migrant workers may face in a simple way.

In particular, after completion of the initial phase/sub-period, workers can move across firms for the interim phase, which constitutes the remainder of the first period. However, in switching firms, they incur a mobility cost which we model simply as a fraction $\gamma_0 \in [0, 1]$ of their general productivity increase, where a higher γ_0 reflects an environment where mobility across firms is more costly. The magnitude of this mobility cost depends, inter alia, on immigration policies 'tying' migrant workers to a specific firm. As described in Table 1, such restrictions are common to some of the largest temporary migration programs across the world. Accordingly, the cost for a temporary migrant worker to move to another firm in the interim period is $\gamma_0 yg(\tau + \alpha e)$. Thus the worker's outside option in this interim phase is given by $y(1 + (1 - \gamma_0)g(\tau + \alpha e))$, while the value of his (increased) productivity to the parent firm is $y(1 + \Delta(\tau + \alpha e))$. Since the worker and the firm are in a situation of bilateral monopoly, as is common in labor-market models with such specificity, we model the interaction between the firm and the worker using Nash bargaining. Denoting the firm's relative bargaining strength by β, the share of the surplus enjoyed by the firm from such a worker is $\beta[y(1 + \Delta(\tau + \alpha e)) - y(1 + (1 - \gamma_0)g(\tau + \alpha e))] = \beta y(s + \gamma_0 g)(\tau + \alpha e)$.

If the worker is allowed to stay in the country beyond the first period (i.e. if he is made permanent), his mobility cost of moving across employers is denoted similarly, as a fraction γ_1 of his enhanced general productivity. Thus, in this case the permanent worker's outside option in all subsequent periods is given by $y(1 + (1 - \gamma_1)g(1 + \tau + \alpha e))$. Again, bargaining between the firm and the worker in such cases yields the firm a surplus from retaining the worker of

$\beta y(s+\gamma_1 g)(1+\tau+\alpha e)$.

The distinction between the cost of mobility for the temporary worker γ_0 and the permanent migrant γ_1 stems from the fact that while the mobility of temporary migrants is often dictated by provisions in the immigration policy, mobility for permanent migrants, γ_1, is more likely to depend on the nature of the country's broader set of labor market institutions. Therefore, examining the impact of changes in γ_1 provides a simple way through which we can capture differences between the labor market institutions that affect worker mobility in (for example) Europe and North America (Blanchard and Wolfers, 2000).[13] It is important to note that if either of the mobility costs are high, then the parent firm can retain a *larger* part of the surplus generated by the increased productivity of the migrant worker.

In what follows we assume that the intertemporal gain in worker productivity is sufficiently high that firms gain a higher surplus from retaining an experienced temporary worker (who has been in a country for a full period) than hiring a new temporary migrant worker, even in the absence of any direct investment in worker training. Therefore, we assume:

Assumption 1: $y - w_0 + \beta y\tau(s+\gamma_0 g) < 2\beta y(1+\tau)(s+\gamma_1 g)$

This assumption implies that firms would prefer to retain their migrant workers and make them permanent rather than repatriating them and recruiting a fresh batch of migrant workers. The incorporation of training costs will only make this preference even stronger.

2.2 Natives, Migrants and Sociocultural Heterogeneity

We describe the preferences of the native citizen-worker, U_N, in every period by:

$$U_N = \text{wage-income} + \text{share of firm profits} - \lambda^*\text{cultural costs} \tag{1}$$

Here native citizens gain from increases in firms' profits due to the filling of productive opportunities by migrant workers, but suffer cultural costs from having foreign migrant workers (we discuss this in detail below). λ is a parameter that denotes the importance of economic gains relative to the cultural costs in the utility function. There are two features that deserve to be emphasized. First, we assume all natives are identical in the sense that each inelastically supplies a unit of labor, *and* also owns an equal share of all firms in the economy. This ensures that distributional effects

[13] See Blanchard (2005) for an overview. Many commentators have argued that both geographic and inter-firm mobility costs are much lower in the U.S. than in Europe (Nickell, 1997; Beffy et. al. (2006), Buchinsky et. al. (2006) and Jolivet et. al. (2004) provide some estimates of labor mobility in France and the U.S.).

are ruled out and hence by assumption, cannot be behind any political backlash against immigration. As discussed earlier, this allows us to focus more closely on the implications of culture and heterogeneity for the politics of immigration policy, rather than on the distributional consequences of migration, which have been analyzed extensively in the existing literature. Second, natives are also assumed to be identical in terms of preferences with respect to foreigners.

Given this symmetry across the i_N native citizens, if w denotes the wage for each native worker and Π the total revenues of all the firms in the economy *net* of wages to migrant workers,

$$U_N = w + \frac{1}{i_N}(\Pi - wi_N) - \lambda\frac{C_c}{i_N} = \frac{1}{i_N}(\Pi - \lambda C_c)$$

where C_c is the total cultural costs imposed by foreign migrant workers, discussed further below. Thus all citizens care identically about $\Pi - \lambda C_c$.

While higher levels of migrant labor boost national income by allowing the implementation of productive opportunities which would have otherwise gone abegging due to a shortage of labor, migration levels also matter because they may change the country's sociocultural makeup. As forcefully argued by Alesina and La Ferrara (2005), Freeman (2006) and Huntington (2004) among others, citizens of a country care not just about their income but also the degree of sociocultural heterogeneity in society.Greater ethnic and cultural diversity can adversely affect a native citizen through its impact on the nature of local public goods provided (see Alesina and Spolaore, 1997) – for example, natives may dislike the fact that the nature of public education might change with greater Hispanic immigration, with resources being diverted away from, say, music and towards teaching Spanish. Alternatively, greater cultural heterogeneity may have a direct (and adverse) impact on an individual's utility through social interaction, as in Alesina and La Ferrara (2005).[14]

We model this disutility by assuming that migrants impose a cultural cost C_c on native citizens. This cost is c_0 for every worker during the first (temporary) period which he spends in the country. However, if a migrant worker stays longer, then from the second period onwards this cultural cost is $c(\frac{n}{1+a})$ where n is the number of migrants present beyond their first period in the country, with $c', c'' > 0$. The parameter a captures the ease with which the migrant becomes culturally assimilated. Greater assimilation (i.e. higher a) lowers the adverse cultural impact of migration. This parameter can also be used to examine the differences in the cultural impact of temporary versus permanent migrants; when a is small, this difference is larger.

The above formulation captures, in a parsimonious way, several aspects of the cultural trade-

[14]See the pioneering work on social psychology by Tajfel et al (1971) that accords with this, and Leyens et al (2003) for a more recent discussion.

offs between having temporary versus permanent migrants (i.e. those staying beyond the first period). Unlike short-term workers, permanent migrants acquire voting rights and may thereby influence the allocation of scarce resources across local public goods in ways that adversely affect native welfare (e.g. by directing resources towards bilingual education).[15] Permanent migrants are also more likely to be accompanied by family, which further increases their cultural 'burden'. Thus overall, permanent migrants may impose higher cultural costs because they arguably threaten the nation's "identity" and ethnic composition, in ways that temporary migrants do not. Furthermore, their influence on society and the cultural burden they impose on the native citizens is likely to be greater as they increase in number. Accordingly, we assume that the marginal cultural cost being imposed by these permanent migrants is increasing in n.[16] For simplicity, we assume that the

[15] There is considerable evidence that suggests that the resistance to permanent immigration is considerable in many countries - especially those without a history of cultural assimilation. Cesarini and Fulbrook (1996) emphasize how the political opposition to immigration is strongest in countries where historically, citizenship and national identity is both ethnic and exclusive (as in Germany or Japan). For example, Japan passed the Immigration Control Act of 1990 to ensure that (despite a severe labor shortage) only ethnic Japanese (upto the third generation) living in other countries would be allowed to emigrate into Japan. However, the suspicion that these *nikkeijin* from Brazil had acquired some Brazilian cultural mores was enough to limit such migration to a maximum of three years (Tsuda, 1999). Indeed the rise to prominence of several political parties in Europe (e.g. Joerg Haider's Freedom Party in Austria or Netherland's VVD) can arguably be attributed to the political salience of immigration as a threat to a country's culture and national identity. The fact that cultural reasons may underpin the reluctance of countries to encourage immigration is argued by Pritchett (2006), Abella (2006), Mayda (2006) as well as Winters et al (2003) who argue that temporary migrants are perceived to be 'less threatening' because they do not permanently influence a country's national identity. Similarly, Freeman (2006) argues that: "Another factor that determines attitudes toward immigration is that immigrants *eventually become citizens and affect politics*". [Emphasis added].

[16] Consider one such mechanism where, by acquiring citizenship and voting rights, permanent immigrants have the potential to change the political dynamic, at least at the local level. Suppose individual i has payoffs given by $u_i = income - A(g - x_i)^2$, where g is the location of a public good provided (e.g. the share of resources spent on language education) and x_i is the 'location' of the individual i, representing his ideal choice. Given this utility function, an individual's ideal choice for the public good is $g = x_i$.

Let us assume that native preferences are uniformly distributed on the unit line, with the (pre-immigration) median voter preferences among the natives (and therefore the location of the public good) given by $g^N = \frac{1}{2}$. Suppose all migrants are identical and have their public good preferences given by $x_M = 1$. Suppose the initial mass of natives is ε. The addition of mass n permanent migrants to the society results in a shift in the identity of the median voter from $x_i = \frac{1}{2}$ to that located at $x_i = \frac{\varepsilon+n}{2\varepsilon}$, resulting in a change in public good provision to $g^M = \frac{\varepsilon+n}{2\varepsilon}$. Given the preferences, the utility of a native located at x_i is now given by $u_i = income - A(\frac{\varepsilon+n}{2\varepsilon} - x_i)^2$; thus, natives whose preferences are closer to $x_i = 1$ gain, while those located near $x_i = 0$ lose. What about overall welfare? Evaluating aggregate utility for the natives, it decreases by $\frac{A}{4}\frac{n^2}{\varepsilon^2}$ i.e., *overall welfare for the native population falls at an increasing rate with permanent migration* n, and *the impact is greater for smaller countries (low* ε*)*.

cultural cost c_0 imposed by temporary migrants is linear in their numbers; allowing some convexity in these costs as well does not qualitatively change the results. While in our benchmark model we assume that the marginal cultural costs $\frac{1}{1+a}c'(\frac{n}{1+a})$ associated with permanent migration are higher than c_0 (the precise assumption is made in the next section), we relax this assumption in section 4, where we endogenize the migrant's assimilation decision. We do this because under some conditions it can be argued that temporary migrants have a lower incentive to invest in cultural assimilation than permanent migrants and these costs are endogenous.[17]

2.3 Politics, Policy and the Migration Protocol

Before proceeding to describe the underlying political structure, we describe the *migration protocol*. In particular, firms with vacant posts are randomly matched with migrants (temporary or permanent) upto the limit imposed by immigration policy. To model the difference between temporary and permanent migrants in a relatively simple and tractable way, we assume that if a migrant worker stays beyond the first period, then he becomes a permanent resident or citizen and cannot be repatriated. Thus the crucial decision comes at the end of the first period, when the government must decide whether to repatriate the existing group of temporary migrants or make them permanent. We neglect any technological constraints in the repatriation of temporary migrants by assuming that the government faces zero administrative costs in enforcing their repatriation. We also assume that all foreign workers are treated symmetrically. This implies that the government can neither selectively tax nor repatriate a subset of these workers. Relaxing these latter assumptions does not alter the qualitative nature of our results. While citizens may prefer the repatriation of temporary migrants and their replacement with a new batch due to their lower cultural costs, firms are solely interested in retaining them for their productivity gains. This conflict between the interests of citizens and the firms works through the political process, which we detail next.

The Political Structure and Immigration Policy: For the political structure, we adapt a model of moral hazard and political accountability, originally formulated by Barro (1973) and Ferejohn (1986) and widely used in various contexts (see Persson and Tabellini (2000)). Elections are held at the end of each period, in which citizen-candidates stand for election. They are all identical and care both about the citizens' aggregate lifetime utility V_N from government policy, as well as

[17] There may be positive cultural benefits as well from having migrants – for example, in the form of increased diversity. Including this (e.g. in the form of negative costs over a certain range) does not change the qualitative nature of our results. We explicitly incorporate such benefits in our analysis of cultural assimilation in section 4.

any rents they acquire, which consist of the ego rents R from holding office as well as any bribes B paid to them to influence their choice of policies. A politician's payoff each period is given by

$$U_{POL} = \theta(R + B) + U_N$$

where θ is the relative weight that he puts on his rents. As in the standard Barro-Ferejohn set-up, government policy is chosen by the incumbent after elections, and there is no commitment to electoral promises. Given the politician's preference function, both the citizens and the firms are in a position to influence (using different instruments) government policymaking. Firms can lobby the government by offering it a bribe to allow firms with experienced workers to retain them (thereby making them permanent workers, who are immune to future repatriation). In contrast, citizen-workers exercise control on government policy by threatening to replace the incumbent government with a randomly-chosen challenger in the upcoming elections. This particular political framework, which involves a dynamic game between the politician, the citizen-workers and also the firm lobby, is similar to the structure in Coate and Morris (1999), who use it to study the adoption and persistence of policies.

The strategies and timing of the game are as follows. At the beginning of the game, citizens observe the degree of labor shortage v in the economy, and decide on a migration policy P^*, which specifies the number of temporary and permanent migrants, (n_T, n_P) to be admitted in that period and in every subsequent period.[18]

At the start of any period t, if the migration policy P^* is still in operation in that period, firms hire the corresponding number of workers from foreign countries at the wage w_0. Then, citizen-voters choose a decision rule Ψ_t that has two components: (i) an election rule $\psi_t^v(\rho_t)$ defined as the probability of re-election of the incumbent politician, and (ii) a policy continuation rule $\psi_t^p(\rho_t)$, defined as the probability of whether to continue with P^* or scrap it altogether in subsequent periods. Both are defined as a function of the incumbent's action ρ_t, where $\rho_t = 0$ if the government repatriates the current set of temporary workers at the end of the period, and $\rho_t = 1$ if

[18] Of course, (n_T, n_P) can be different in different periods. Indeed, as we show below, the optimal path may involve bringing in all the permanent migrants immediately, rather than adding to their number every period.

In Appendix B, we consider an alternative formulation of the model where, at the beginning of each period, citizens choose afresh the number of migrants to bring in. The qualitative results are the same as in the present version. The current formulation has the (perhaps more realistic) assumption that a referendum on the form of migration policy takes place at the beginning of the labor shortage, and then every period people vote only on whether to continue with the policy or scrap it, rather than having a new referendum on the number of migrant workers in every election.

the government makes them permanent. Firms that receive the migrant workers observe the voting rule, invest in worker-training e_T and e_P, and form a lobby to choose a bribing strategy η_t which determines the bribe B_t to offer the politician in exchange for preventing repatriation and instead retaining their experienced temporary migrant workers.[19] The incumbent politician observes the citizens' voting rule and the bribe offered by the lobby, and decides on immigration policy. The politician can choose either to reject the bribe and implement the policy $\rho_t = 0$ of repatriating the temporary workers, or accept the bribe and implement $\rho_t = 1$ i.e. allow the firms to retain their experienced migrant workers, which effectively gives these workers permanent residence. The politician's decision on whether or not to allow firms to retain their experienced migrant workers is observed by citizen-voters, who then implement their voting rule Ψ_t which determines whether or not the incumbent politician is re-elected, and whether or not the migration policy P^* is to be continued in the next period, or scrapped. The timing of the game is depicted in figure 1.

As mentioned above, an aspect of this particular formulation involves citizens choosing in every period whether to continue with the current migration policy or to scrap the policy completely. While, in general, one can consider the optimal updated continuation policy in each case, in reality coordinating on such complicated voting decisions may be difficult. Thus we adopt the simple possibility of only voting on continuing with the current policy or not. In Appendix B we demonstrate in an alternative formulation of the model that allowing for more general continuation policies does not alter the qualitative nature of our results.

Formally, this defines a dynamic game between the politicians, the firms and the representative citizen. An equilibrium strategy profile (Ψ_t, η_t, ρ_t) requires that each player's strategy constitute a best response to the other players' equilibrium strategies. Next period, the same cycle is repeated, with either the re-elected politician, or the newly elected government that replaces him.

3 Equilibrium Analysis

We begin by briefly delineating key features of the social planner's problem by describing the optimal migrant mix in the *absence* of any political considerations on the part of the government. Having established the social optimum as a benchmark, we then analyze the equilibrium with

[19] The total number of firms is assumed to be large relative to the vacant productive opportunities that occur. Thus, *ex ante*, the chance that any particular firm will have a vacancy for which it will need a migrant worker is small. Hence it has little *ex ante* incentive to join a lobby to press the government to expand the temporary migration program. However, *ex post*, once a firm has an experienced worker on its payroll, its incentive in trying to retain this worker permanently is much stronger.

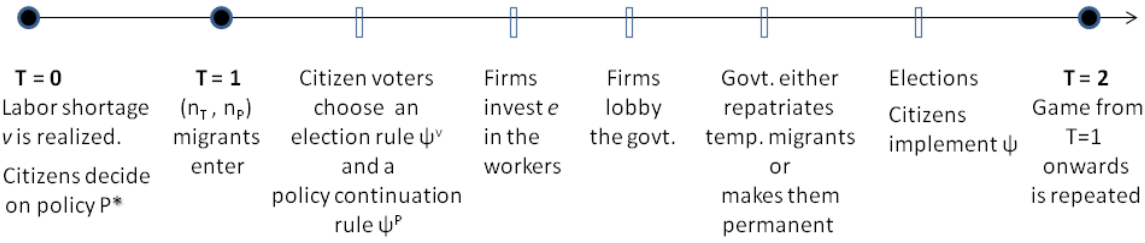

Figure 1: Timing of the game

political factors at work in section 3.2.

3.1 The Socially Optimal Mix: Temporary versus Permanent Migrant Workers

A social planner maximizes the representative citizen's discounted stream of utility, by choosing the socially optimal number of temporary migrant workers m_T and permanent immigrants m_P, and the level of investment (in worker training) e_T and e_P which solve the following problem:

$$\max_{m_T,m_P,e_T,e_P} (S_T(e_T) - t(e_T) - \lambda c_0)\frac{m_T}{1-\delta}$$
$$+(S_P^0(e_P) - t(e_P) - \lambda c_0)m_P + \frac{\delta}{1-\delta}[S_P^1(e_P)m_P - \lambda c(\frac{m_P}{1+a})]$$

subject to the constraint that $m_T + m_P \leq v$. Here $S_T(e_T) = y - w_0 + \beta y(s + \gamma_0 g)(\tau + \alpha e_T)$ is the economic contribution to national welfare by a temporary migrant worker in any period. The next two terms comprise the discounted lifetime payoff from having m_P permanent migrants in the country, where $S_P^0(e_P) = y - w_0 + \beta y(s + \gamma_0 g)(\tau + \alpha e_P)$ denotes his economic contribution in the first period and $S_P^1(e_P) = 2\beta y(s + \gamma_1 g)(1 + \tau + \alpha e_P)$ in all subsequent periods. The following assumption ensures that the surplus from temporary migrant workers, net of their cultural costs (even at $e_T = 0$), is positive.

Assumption 2: $y - w_0 + \beta y\tau(s + \gamma_0 g) - \lambda c_0 > 0$

If the above inequality is violated, it will never be socially optimal to admit temporary migrants.

To examine the socially optimal mix of migration, we substitute for $S_T(e_T)$, $S_P^0(e_P)$ and $S_P^1(e_P)$ in the optimization above, and the first-order conditions with respect to e_T and e_P give:

$$\alpha\beta y(s + \gamma_0 g) = t'(\widehat{e}_T) \qquad \text{and} \qquad \frac{\alpha\beta y}{1-\delta}((1+\delta)s + \{\gamma_0(1-\delta) + 2\gamma_1\delta\}g) = t'(\widehat{e}_P) \qquad (2)$$

where $\widehat{e}_T$ and $\widehat{e}_P$ denote the optimal level of training provided by firms, to temporary and permanent migrant workers, respectively. As has been analyzed in the extensive literature on worker-training (e.g. Acemoglu and Pischke (1999), Majumdar (2007)), here too the level of the firm's investment in the worker is related to the degree of friction in the labor market as characterized by the parameters γ_0 and γ_1. Firms can capture more of the gains from their investment when these frictions are higher, and consequently invest more in such cases.

The first-order condition with respect to m_T yields three possibilities:

$$\begin{gathered}
\text{if } \Lambda(\widehat{e}_T, \widehat{e}_P) + t(\widehat{e}_T) - (1-\delta)t(\widehat{e}_P) - \delta[\frac{\lambda}{1+a}c'(0) - \lambda c_0] \leq 0, \text{ then } m_P = 0, \\
\text{if } \Lambda(\widehat{e}_T, \widehat{e}_P) + t(\widehat{e}_T) - (1-\delta)t(\widehat{e}_P) - \delta[\frac{\lambda}{1+a}c'(\frac{v}{1+a}) - \lambda c_0] \geq 0, \text{ then } m_P = v, \\
\text{otherwise } \Lambda(\widehat{e}_T, \widehat{e}_P) + t(\widehat{e}_T) - (1-\delta)t(\widehat{e}_P) - \delta[\frac{\lambda}{1+a}c'(\frac{m_P}{1+a}) - \lambda c_0] = 0, \qquad (3) \\
\text{where } \Lambda(\widehat{e}_T, \widehat{e}_P) = (1-\delta)S_P^0(\widehat{e}_P) + \delta S_P^1(\widehat{e}_P) - S_T(\widehat{e}_T)
\end{gathered}$$

and the solution for m_T is that temporary migrants fill up the rest of the shortage i.e. $m_T = v - m_P$.

Our framework emphasizes the following factors as being key in driving the socially optimal mix of temporary and permanent migrants. The first is an 'investment' effect in that firms are willing to invest much more in training permanent workers than temporary ones, as can be seen from (2), which implies that $\widehat{e}_P > \widehat{e}_T$.[20] This effect is reinforced by an 'amortization' effect. It arises from the fact that the training cost for a permanent worker can be amortized over a much longer time horizon than for a temporary worker. This is given by the term $t(e_T) - (1-\delta)t(e_P)$ in the expressions above. The resulting difference in productivity between the two types of migrant workers, and its impact on the country's national income is captured by the term $\Lambda(e_T, e_P)$. While the economic impact of migration clearly favors permanent workers, the culture/national-identity impact of permanent migration also needs to be accounted for in determining the optimal mix. This inter-temporal "cultural assimilation" effect is captured by $\frac{\lambda}{1+a}c'(\frac{m_P}{1+a})$ versus λc_0.[21] Given these effects, two main possibilities arise:

[20] Among immigrants in Canada, Park (2011) finds that non-citizens have a much lower incidence of employer-supported job-training as compared to immigrants who have acquired citizenship (i.e. permanent migrants in our framework). Evidence by Dustmann (1993) using German data also suggests that investment in human capital and worker training depends positively on length of stay in the country.

[21] Of course, a country's ability to assimilate foreign migrants is likely to be a function of the ethnicity of the migrant workers and the ability of the country's society to absorb and integrate migrants into the national fabric, and may differ widely across countries. In section 4 we endogenize the migrant's cultural assimilation decision and make it a function of his perceived length of migrant tenure in the host country.

(i) Corner Solutions: Permanent Immigration versus Temporary Migration: The social planner's optimization problem may result in a corner solution where only temporary migrants are admitted to fill all available posts, i.e. $m_T = v$ and $m_P = 0$. This is the case when the cultural costs of permanent immigration are so high that it is not worth the increase in productivity, i.e. when $\Lambda(\widehat{e}_T, \widehat{e}_P) + t(\widehat{e}_T) - (1-\delta)t(\widehat{e}_P) - \delta\lambda[\frac{c'(0)}{1+a} - c_0] < 0$. The reverse case, i.e. $m_T = 0$, is also possible, where only permanent migrants are used. This will be the case when the enhanced productivity of permanent migrants is enough to outweigh the cultural cost from even filling all v slots with permanent migrants i.e. if $\Lambda(\widehat{e}_T, \widehat{e}_P) + t(\widehat{e}_T) - (1-\delta)t(\widehat{e}_P) - \delta\lambda[\frac{c'(v)}{1+a} - c_0] > 0$.
(ii) Interior Solution: Both Temporary Migrants and Permanent Immigration: Alternatively, for a wide set of parameters we may have an interior solution with both temporary and permanent migrants i.e. $m_T, m_P > 0$. Such an outcome is possible if the cultural costs of the temporary migrants do not outweigh their productivity benefits, and at the same time, the cultural impact of filling all v slots with permanent migrants is too high relative to temporary ones i.e. $\Lambda(e_T, e_P) + t(e_T) - (1-\delta)t(e_P) - \frac{\lambda}{1+a}c'(\frac{v}{1+a}) < 0$. In this case, the social optimum will consist of bringing in permanent migrants up to the point where their productivity surplus, offset by their rising cultural cost, just equals the surplus from temporary migrants, and then filling the rest of the worker shortage using temporary migrants, as given by condition (3).

3.2 Politics and Barriers to Entry: Equilibrium Analysis

We turn next to incorporating political considerations in the migration policy decision. As mentioned earlier, this now involves a dynamic interaction between the decisions of the citizen-voters, the firms and the government. We proceed below in a series of steps. For expositional simplicity, we begin by considering the parameter range where permanent migration does not take place. By 'freezing' permanent migration, we are able to focus on the level of temporary migration and to develop some insight for the sorts of policies that may sustain welfare-improving (higher) levels of temporary migration. In the subsection 3.2.2 that follows, we open up the parameter space to consider migration regimes that entail permanent migration as well.

3.2.1 Only temporary migrants

To understand the impact of political constraints on immigration, we first study the case where the only decision is on how many *temporary* migrants to let in every period. This will be the case when the marginal cultural cost of even a single permanent migrant is so high as to outweigh their

economic gain. Thus in this section, we make the following assumption on the parameters:

Assumption 3: $\Lambda(\widehat{e}_T, \widehat{e}_P) + t(\widehat{e}_T) - (1-\delta)t(\widehat{e}_P) < \delta\lambda[\frac{c'(0)}{1+a} - c_0]$

Together with assumptions 1 and 2, this implies that $\frac{1}{1+a}c'(0) > c_0$ i.e. the marginal cultural cost imposed by temporary migrants is smaller than that imposed by any permanent migrant.

Under this parameter restriction, given assumption 2 that the surplus from employing them is positive, the socially optimal decision in this case would be to fill all the v vacancies with temporary migrants. However, it is possible that once admitted, the firms' lobby may bribe the government into making the temporary workers permanent, in order to reap the benefits of their increased productivity. This possibility, and the resultant large cultural costs, may limit the extent to which citizens are willing to allow in temporary workers in the first place. Observe that since the social optimum here is rather simple and involves a rotating pool of v (temporary) migrants every period, the extent of inefficiency can be easily measured as the deviation of migration policy from this level.

Consider first the citizen's decision in every period, which has two components – an election rule and a policy continuation rule. Here the primary issue under consideration is the repatriation of the temporary migrants versus their being made permanent. Thus the citizen's decision rule Ψ_t implements the re-election rule $\psi_t^v(\rho_t)$ as well as the policy continuation rule $\psi_t^p(\rho_t)$ to maximize the incentives it provides to the incumbent politician to follow the citizen's migration preferences. Hence the citizen's equilibrium voting rule is very simple: the incumbent government will be re-elected if and only if all temporary workers are repatriated. A second aspect of this decision involves continuation of the migration policy if the government were to deviate and in fact allow the firms to retain the temporary workers permanently. Since politicians care both about rents from being in office *as well as* future welfare, the strongest incentive can be provided to them by promising the worst possible outcome on both dimensions. Since by assumption 2, the welfare benefit from bringing in temporary workers is always positive, the worst outcome on the welfare dimension is to scrap migration programs forever. Thus the promised (punishment) strategy following a deviation is $\psi_t^v(\rho_t = 1) = 0$ and $\psi_t^p(\rho_t = 1) = 0$. While one may view this as the usual grim trigger strategy of repeated games, here it can also be interpreted as the electorate losing faith in the political viability of migration and choosing to scrap it.[22]

[22] It may be useful to make two points at this stage. First, instead of considering totally scrapping migration following a deviation, one might instead consider allowing the citizens to optimally chose a new policy at every stage following a deviation. We do this in Appendix B using a three-period version of the model. The analysis shows that the basic insight still holds, and in fact the degree of inefficiency is exacerbated as a result.

We focus next on periods where the migration policy P^* of bringing in n_T temporary migrants is in place. Since the surplus to a firm from employing a temporary worker is given by $S_T(e_T)$, the degree of investment by the firm in the worker is still given by $\widehat{e}_T$ from (2).

Consider next the equilibrium strategy of the incumbent politician. If offered a bribe B to retain the temporary migrants, he trades off the gain from accepting the bribe versus the loss in ego-rents R from being voted out of office as well as future welfare. In any period, the incumbent politician's lifetime payoff from accepting the bribe ($\rho = 1$), to retain n_T temporary workers, is

$$V_I(\rho = 1; n_T) = \theta[R + B] + U_N(n_T, 0) + \delta V_N(\rho = 1; n_T)$$

where $U_N(a, b)$ represents the native citizens' utility this period from having a temporary migrants and b permanent migrants in the economy, and $V_N(\rho = 1; n_T)$ is the citizen's lifetime utility from tomorrow if the incumbent pursues the policy $\rho = 1$ today i.e. allows the n_T workers to stay on permanently. In this case, since the incumbent is ousted from office, he enjoys no further rents. Since the migration policy is scrapped altogether as a result of such a deviation, $V_N(\rho = 1; n_T)$ is the utility from having only the n_T permanent workers in the future, and is given by $V_N(\rho = 1; n_T) = \frac{1}{1-\delta} U_N(0, n_T)$.

In contrast, the incumbent politician's payoff from rejecting the bribe ($\rho = 0$) and adhering to the voters' wishes equals

$$V_I(\rho = 0; n_T) = \theta R + U_N(n_T, 0) + \delta V_I(\rho = 0; n_T)$$

where $V_I(\rho = 0; n_T)$ is the value function that the politician associates with being in power, having complied with the voters' wishes to have a rotating pool of n_T temporary migrant workers. If the politician continues with the policy of repatriating the temporary migrants, then he enjoys being in office the following period as well. Thus the total gain to the politician from not deviating is given by solving the above equation to get:

$$V_I(\rho = 0; n_T) = \frac{\theta R}{1 - \delta} + \frac{U_N(n_T, 0)}{1 - \delta}$$

Therefore if the number of temporary migrants under consideration is n_T, the incentive constraint for the politician to follow $\rho = 0$ (i.e. reject bribe) is given by:

Second, an alternative to choosing a policy continuation rule would be to choose the type of new politician to elect into office. Suppose there are two types of politicians: pro- and anti- immigration. Then, on deviation, the voters could commit to always choosing anti-immigration politicians in the future, who would never implement any immigration programs at all.

$$V_I(\rho = 0; n_T) \geq V_I(\rho = 1; n_T)$$

Substituting for the V_I's from above, the minimum bribe-level B^{accept} that will be accepted by the politician to allow n_T experienced temporary workers to be retained by their employers is given by:

$$\theta B^{\text{accept}} + \frac{\delta}{1-\delta} U_N(0, n_T) = \frac{\delta}{1-\delta}\theta R + \frac{\delta}{1-\delta} U_N(n_T, 0) \tag{4}$$

where the natives' utility function U_N incorporates both the additional income as well as the heterogeneity-disutility from the immigrant workers. Hence we have:

$$\begin{aligned} U_N(0, n_T) &= S_P^1(\widehat{e}_T) n_T - \lambda c(\frac{n_T}{1+a}) \\ U_N(n_T, 0) &= (S_T(\widehat{e}_T) - t(\widehat{e}_T) - \lambda c_0) n_T \end{aligned}$$

On the other side, recall that the firm lobby makes a take-it-or-leave-it offer to the politician where, in exchange for a bribe B, the politician agrees to let the lobbying firms retain their temporary migrants permanently. Thus we need to determine the maximum level of bribe that the firm lobby is willing to offer. For each firm, an extra experienced worker from period $t = 2$ onwards yields output of $y(1 + \Delta(1 + \tau + \alpha\widehat{e}_T))$ each period. As discussed before, the surplus for the firm from having such a worker is $\beta y(s + \gamma_1 g)(1 + \tau + \alpha\widehat{e}_T) = S_P^1(\widehat{e}_T)$. Hence the maximum bribe the firm lobby will be willing to pay for retaining permanently the n_T temporary workers is:

$$B^{\text{willingness}} = \frac{\delta}{1-\delta} S_P^1(\widehat{e}_T) n_T$$

The incentive-compatibility constraint for the politician requires that this maximum bribe-level not be enough to persuade the politician to retain the temporary migrants i.e. $B^{\text{willingness}} \leq B^{\text{accept}}$, which using (4) requires:

$$\begin{aligned} & \theta \frac{\delta}{1-\delta} S_P^1(\widehat{e}_T) n_T + \frac{\delta}{1-\delta}[S_P^1(\widehat{e}_T) n_T - \lambda c(\frac{n_T}{1+a})] \\ \leq \; & \theta \frac{\delta}{1-\delta} R + \frac{\delta}{1-\delta}(S_T(\widehat{e}_T) - t(\widehat{e}_T) - \lambda c_0) n_T \end{aligned} \tag{5}$$

If this constraint is satisfied, then the optimal choice for a politician in any period will involve $\rho = 0$.

At the start of the game, in trying to decide on migration policy P^*, native citizens will take into account this constraint on politicians' actions. Recall that in this section, we are considering the case where the only decision is on how many *temporary* migrants to let in every period. Since

by Assumption 2 the gain from bringing in temporary workers is positive so long as they are not made permanent, the optimization problem for the citizen boils down to choosing the maximum number of temporary migrants n_T subject to the incentive constraint above. Rewriting it, we have:

$$n_T[(1+\theta)S_P^1(\widehat{e}_T) - (S_T(\widehat{e}_T) - t(\widehat{e}_T) - \lambda c_0)] - \lambda c(\frac{n_T}{1+a}) \leq \theta R \qquad (IC')$$

This is portrayed in figure 2(a). Given that $c(.)$ is convex, the left-hand side of the inequality is concave in n_T, while the right-hand side is constant. It is clear from the figure that unless the end point (i.e. at $n_T = v$) of the left-hand side of (IC') lies below θR, the equilibrium level of temporary migration will be lower than the social optimum. This is summarized in the proposition below.

Proposition 1 *Under assumptions 1-3, if*

$$[(1+\theta)S_P^1(\widehat{e}_T) - (S_T(\widehat{e}_T) - t(\widehat{e}_T) - \lambda c_0)]v - \lambda c(\frac{v}{1+a}) > \theta R \qquad (6)$$

then, under political constraints, the equilibrium level of temporary migrants n_T^* will be lower than the socially optimal level, i.e. $n_T^* < m_T$.

The basic intuition for the result is fairly straight-forward. Since firms gain from retaining temporary migrant workers, they lobby the politician to not repatriate the temporary migrants. An increase in the number of temporary workers increases the resources the firms are willing to expend to effectively lobby the government. Anticipating this, at the beginning citizens decide on a suboptimal (low) number of temporary migrants.

Put another way, the proposition suggests a case of *political failure* in the sense that everyone may gain from an alternative policy. There exist other (higher) levels of temporary migration that all parties would prefer. It is straightforward to see that firms would benefit from having more temporary migrants to fill the available vacancies. For the citizens as well, higher levels of temporary migration are preferable, since by assumption 2 the immigration surplus, net of the cultural cost, from each extra temporary worker is positive. However, the inability of citizen-voters to exercise intertemporal control over the politician means that these levels are not politically sustainable.

Aspects of the above political equilibrium are perhaps best understood by examining the impact of differences in the relevant parameters of the model on the degree of inefficiency. When is such political failure more likely? The following corollary to Proposition 1 addresses this.

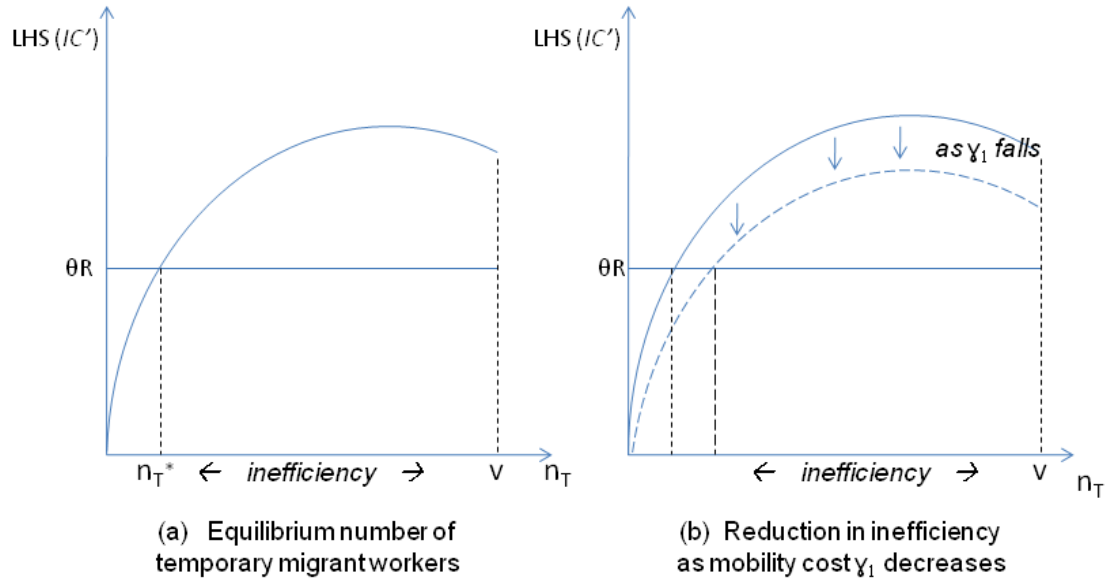

Figure 2: Equilibrium with political constraints

Corollary 1 *Under the conditions in Proposition 1, the level of temporary migration n_T^* increases with (i) economic factors: a fall in the inter-temporal productivity increase s or in the initial wage cost w_0, or a decrease in the labor market mobility cost γ_1, or a fall in the firm's bargaining power β, (ii) cultural factors: an increase in the cultural costs λ from migration, or a lower degree of assimilation by migrants a.*

Proof. A decrease in s, w_0, γ_1, β or a or an increase in λ tends to lower the left-hand side of (IC'). (For λ, $\frac{dLHS(IC')}{d\lambda} = n_T c_0 - c(\frac{n_T}{1+a}) = \int_0^{n_T}[c_0 - \frac{1}{1+a}c'(\frac{n_T}{1+a})]dn < 0$ by assumption 3.) From figure 2(b) it is then clear that this will result in a increase in n_T^* (although the figure depicts the impact due to a change in γ_1, analogous figures hold for the other parameters as well). ■

The above corollary thus suggests, somewhat surprisingly, that higher cultural costs as well as greater ease of mobility across firms may both be associated with a *higher* level of temporary migration. Explicit consideration of political constraints in the determination of migration policy is central to these results. To see the intuition consider the following examples. In a labor market with higher mobility (i.e. a lower γ_1), the economic rent to a firm from retaining a migrant worker (and making him permanent) is likely to be lower. This reduces the maximum amount the firm lobby is willing to pay the government in order to retain its migrant workers, and makes a higher

level of temporary migration sustainable, i.e. incentive compatible. Similarly, a decrease in the initial wage cost w_0 makes it less attractive for firms to retain experienced migrant workers as compared to freshly recruiting (low productivity) temporary workers at the wage w_0. Thus, it serves to increase the level of politically sustainable temporary migration.

The results can be used to examine the impact of some aspects of immigration policies. We highlight two of them below. First, a country may prefer to import (temporary) migrants from culturally *dissimilar* countries rather than from culturally similar ones. Second, the degree to which temporary migrant workers are allowed to change employers within the host country could be related to inherent features of the country's labor market. We analyze these in turn below.

I. Culture and Guest Worker programs: Our framework has two distinct insights on the role of culture and the design of guest worker programs. First, on the positive side, our framework suggests that larger temporary migration programs are more sustainable in countries with a higher aversion to foreign workers (i.e. a high λ) or where assimilation into the native society is more difficult (i.e. a low a) or where the native population is small so that the impact of migrants is potentially larger (see footnote 16). In other words, *ceteris paribus*, we can have larger temporary migration programs in (high λ) countries such as Japan as compared to (relatively low λ) countries such as Canada. Second, on the normative side, our analysis suggests that a simple way in which the degree of inefficiency can be reduced is by replacing, for example, culturally similar (low λ or high a) migrants with culturally distinct (high λ or low a) migrants, resulting in higher levels of politically sustainable temporary labor migration – thus boosting overall national income and welfare.

Both these insights follow directly from Corollary 1 (ii). In particular, this corollary suggests that because it is (politically) much more costly (in terms of future payoffs) to the government to provide citizenship to culturally (dis)similar migrant workers (i.e. when λ is high or a is low), the firm lobby needs to make a larger bribe in order to successfully persuade the politician to retain the temporary workers in this case. Therefore, the sustainable level of temporary migration n_T^* rises with the cultural distance of the migrants.

Some of the largest ongoing temporary migration programs in the world are in the Middle East – Bahrain, Kuwait, Saudi Arabia and the UAE being prominent examples. During the late eighties there was a big expansion in the size of the guest-worker programs in these Gulf countries as well as an important change in the nature of the programs. In particular, there was a large shift in the source countries for much of the migrant workforce, away from other Arab countries, such as Egypt, Yemen and Jordan, which had previously been the main sources from which migrant

workers were drawn. Instead, these host countries chose to deliberately replace temporary migrants of Arab origin with those of South (or South East) Asian origin. In fact, there was a decrease in not just the share, but even in the absolute number of Arab workers.[23] While a number of factors could have driven this policy switch, our analysis offers the intriguing possibility that the political sustainability of the expanded programs was possible precisely because of the cultural dissimilarity of the South Asian guest workers, as against the Arab guest workers. Indeed, Jureidini (2006) in his survey of temporary migration programs in the Gulf States, argues that one factor that contributed to the replacement of Arab workers with other Asians was that "Arabs were more likely to stay and eventually make demands for citizenship and political participation. Asians were considered more dependable and less demanding and were easily expelled."[24]

II. Employer Assignment and the (im)Mobility of Guest Workers: One of the salient aspects of most temporary labor migration programs has been the fact that the guest workers are tied to specific employers i.e. restricted in their movement to firms other than the original employer. As described in Table 1, this feature is common to some of the largest temporary migration programs across the world, in countries such as the U.S., Kuwait and Switzerland.[25]

In our model, the degree of mobility for temporary migrant workers is captured by the parameter γ_0 which denotes the cost of changing employers during their period of temporary stay in the country. This parameter, which could be regulated by policies which delineate restrictions on the movement of migrant workers, could range from a low value of γ_1 (no restrictions i.e. same mobility costs as faced by permanent workers) to a high of 1 (full restrictions i.e. no possibility of changing employers). What are the trade-offs involved in the optimal choice of this policy?

We begin by observing that restrictions on the mobility of guest workers lowers their bargaining power and adversely affects their wages. This increases profits of the host country firms that hire these workers, and thereby directly increases national welfare. However, as γ_0 rises, it also has an

[23] The Arab share of the foreign worker population in the countries of the Gulf Cooperation Council (GCC) went down from 56 percent in 1985 to 32 percent in 2002. This decrease in the Arab share of temporary migrants was mirrored by the rise in the share of South and South East Asian migrants over the same period. For details, see Kapiszewski (2006).

[24] One might be hesitant to draw wider implications, given the large differences in the nature of politics in liberal western democracies as compared to the Middle East. However, we should point out that a simple modification of our model, where elections are replaced with the threat of political instability in a single-party/authoritarian regime, would also generate very similar results.

[25] While not strictly a temporary labor migration program, the *H-1B* program in the United States assigns foreign workers to specific employers and makes mobility across employers costly (Ruhs, 2002).

impact on the level of temporary migration that is politically sustainable. This happens through two channels. One, an increase in γ_0 raises the firm's investment in the worker, $\widehat{e}_T$, as can be seen from (2). Thus it raises the value to the firm from retaining the worker in the long term and thereby serves to enhance the firm's incentive to lobby the government to make the temporary worker permanent. Two, as γ_0 rises, it makes a temporary worker more valuable relative to a permanent one, and thus serves to diminish the firm's lobbying incentives. The interaction of these various forces shapes the optimal choice of mobility policy γ_0, which is analyzed systematically in the proposition below.

Proposition 2 *Under the conditions in Proposition 1, if*

$$(\frac{1}{\alpha} + \widehat{e}_T)(s+g) > 2(1+\theta)(s+\gamma_1 g)\frac{t'(\widehat{e}_T)}{t''(\widehat{e}_T)} \tag{7}$$

then the optimal choice of policy would involve $\gamma_0 = 1$ (i.e. maximal restrictions on mobility). Otherwise, it would be optimal to allow some degree of inter-firm mobility for temporary migrants i.e. $\gamma_0 < 1$.

PROOF: See Appendix A.

This proposition identifies conditions under which 'tying' guest workers to their original employer is a good thing from the *host* country's point of view and when it is better to allow some flexibility in their movement. Looking at (7), one can see that maximal restrictions on mobility are optimal when the inherent labor market in the country is very open i.e. when γ_1 is low, or in sectors where training is not very important (i.e. α is small) or when the elasticity of worker training with respect to a change in the firm's share of the surplus (given by the term $t'(\widehat{e}_T)/t''(\widehat{e}_T)$) is low. In these cases, greater restrictions on the mobility of temporary workers do not have a big impact on the firm's investment in the worker or on the future surplus from the worker. Thus the political feedback of these higher restrictions is minimal. Moreover, restrictions on the mobility of the temporary migrant directly increase the host country welfare by enabling extraction of a bigger share of the surplus. Hence, in these cases, it is optimal to make the restrictions γ_0 as large as possible. On the other hand, when condition (7) does not hold, allowing temporary migrant workers some mobility across employers can improve the host country's welfare by making a higher time-consistent level of temporary worker migration politically sustainable.

This suggests that restrictions on the mobility of temporary migrant workers are more likely to be optimal in a country with mobile labor market institutions as in North America (as in the

case of the H1-B program) and less likely to be optimal in labor markets where there are greater frictions (as in some countries in Europe - see Bauer, Lofstrom and Zimmerman, 2000), and also in sectors where investment and the development of a worker's productivity is very important.[26]

The preceding discussion analyzed two possible mechanisms through which governments could credibly commit to make temporary migration politically sustainable. There are also other commitment devices available to governments. For instance, Kremer and Watt (2009) prescribe the migration of female workers for households (e.g. *au pairs*) as a means to relax the politically sustainable level of temporary migration. In part this is because such a policy automatically limits family reunification and is less likely to have an impact on crime. Variants of such policies have operated in parts of the Middle East, Singapore (Filipino au pairs) and Canada (seasonal agricultural workers in which only married men with children could participate, see Abella (2006)). Alternately, policies could be related to the nature of wage-payments for migrant workers. For example, the *Bracero* program had a provision under which a part of the migrant worker's wages and salaries were withheld and kept as savings and given back to the migrant only upon return to Mexico. By making it harder for firms to hold on to workers in the long run, such mechanisms reduce their incentives for lobbying the government and thus make politically feasible larger-sized temporary migration programs.

3.2.2 Temporary and permanent migrants

So far we have considered the case when the marginal cultural impact of permanent migrants is so high that citizens decide only on the number of temporary migrants to be allowed into the country to meet the labor shortage v. If the cultural cost is more moderate, and this labor shortage is expected to last indefinitely into the future, it may be worthwhile to fill some of the positions with permanent migrants and then use temporary migrants to fill the remaining slots. Thus in this section, we make the following assumption, as an alternative to Assumption 3:

Assumption 4: $\delta\lambda[\frac{c'(0)}{1+a} - c_0] < \Lambda(\widehat{e}_T, \widehat{e}_P) + t(\widehat{e}_T) - (1-\delta)t(\widehat{e}_P) < \delta\lambda[\frac{c'(v)}{1+a} - c_0]$

This assumption implies that the marginal cultural impact of a few permanent migrants is small enough so as to make the overall gain from their employment greater than that from temporary migrants. However, the cultural cost from filling all v slots with permanent migrants is so high as to outweigh the economic gain from doing so. Under this assumption, in this section we study the

[26] For example, under the United Kingsdom's 'Highly Skilled Migrant program', migrants are admitted without having a prior job offer. Once they have found a job, they are free to change employers.

political considerations in play when citizens choose the number of permanent migrants to bring in along with the number of temporary ones.[27]

Note that the degree of investment by a firm in any temporary worker is still given by $\widehat{e}_T$ and that for a permanent worker by $\widehat{e}_P$ from (2). Now, if $n_P(i)$ is the number of permanent migrants admitted into the country in period i and $n_T(i)$ the number of temporary migrants admitted (and due to be repatriated at the end of the period), the overall national welfare is given by:

$$\sum_{i=1}^{\infty} \delta^{i-1}[(S_T(\widehat{e}_T)-t(\widehat{e}_T)-\lambda c_0)n_T(i)+(S_P^0(\widehat{e}_P)-t(\widehat{e}_P)-\lambda c_0+\frac{\delta}{1-\delta}S_P^1(\widehat{e}_P))n_P(i)-\delta\lambda c(\frac{\sum_{j=1}^{i} n_P(j)}{1+a})]$$

As before, $S_T(\widehat{e}_T) - t(\widehat{e}_T) - \lambda c_0$ is a temporary migrant's contribution to national welfare net of the cultural costs he/she imposes. The permanent migrant's net impact on national welfare during the first period is given by $S_P^0(\widehat{e}_P) - t(\widehat{e}_P) - \lambda c_0$ and this changes to $S_P^1(\widehat{e}_P) - \lambda c(\frac{\sum_{j=1}^{i} n_P(j)}{1+a})$ for subsequent periods, which takes into account the part of the productive surplus retained by the native firms as well as the cultural costs imposed. This overall welfare is to be maximized subject to the government's incentive constraint, which is very similar to the constraint (5) in the case of only temporary migrants, but now taking into account that permanent migrants are also being brought in. While the constraint is given explicitly in Appendix A, the important extra factor at work here is that the addition of n_P permanent migrants changes the marginal cost of retaining a temporary worker permanently, from $\frac{\lambda}{1+a}c'(0)$ to $\frac{\lambda}{1+a}c'(\frac{n_P}{1+a})$.

In the first-best case i.e. without the incentive constraint, the optimal outcome would involve importing all permanent migrants (if any) in the first period itself and then filling the rest of the slots using a rotating pool of temporary migrants. The intuition for this stems from the fact that the cultural costs imposed by permanent migrants are the same regardless of when they are imported. If their productivity gains outweigh these costs, then the gains should be availed of as early as possible. We first show (in the lemma below) that even in the presence of constraints to ensure that the politician does not succumb to the firms' lobbying efforts, the structure of the solution remains similar, i.e. the optimal still involves importing permanent migrants only in the

[27] We should point out that once permanent, migrants can have the same political rights as citizens. If the native population is homogenous with respect to preferences over immigration, naturalizing the permanent migrants and granting them voting rights does not change the identity of the median voter (and thus the political equilibrium) unless the immigrant-citizens become a majority. In Appendix B, we examine the possibility that immigrant-citizens may affect the politics of immigration in the future (as in Ortega (2005)). We show that native citizens will then be even more hesitant to admit them in the first place and therefore, this will serve to only exacerbate the degree of inefficiency in migration levels in the paper.

first period, together with a rotating pool of temporary migrant workers. This helps to simplify analysis of the equilibrium, which we do subsequently in proposition 3.

Lemma 1 *In the presence of political constraints, the optimum will involve admitting all permanent migrants in the first period (i.e.* $n_P(i) = 0$ *for* $i \geq 2$*) and filling the rest of the slots with a rotating pool of temporary migrants every period (i.e.* $n_T(1) = n_T(2) = n_T(3) = ...$*).*

PROOF: See Appendix A.

Denoting by n_P the number of permanent migrants admitted in the first period and by n_T the number of temporary migrants every period, the overall welfare is now given by:

$$\frac{1}{1-\delta}(S_T(\widehat{e}_T) - t(\widehat{e}_T) - \lambda c_0)n_T + \{S_P^0(\widehat{e}_P) - \lambda c_0 + \frac{\delta}{1-\delta}S_P^1(\widehat{e}_P)\}n_P - \frac{\delta}{1-\delta}\lambda c(\frac{n_P}{1+a}) \tag{8}$$

while the government's incentive constraint is:

$$\begin{aligned} &\theta\frac{\delta}{1-\delta}S_P^1(\widehat{e}_T)n_T + \frac{\delta}{1-\delta}[S_P^1(\widehat{e}_T)n_T - \lambda c(\frac{n_T+n_P}{1+a})] \\ &\leq \theta\frac{\delta}{1-\delta}R + \frac{\delta}{1-\delta}[(S_T(\widehat{e}_T) - t(\widehat{e}_T) - \lambda c_0)n_T - \lambda c(\frac{n_P}{1+a})] \end{aligned} \tag{9}$$

The equilibrium level of permanent and temporary migration is then determined by maximizing (8) subject to the above incentive constraint along with the constraint $n_T + n_P \leq v$. The following proposition compares it with the socially optimal level.

Proposition 3 *Under assumptions 1,2 and 4, under political constraints, the optimal mix of migrants will involve an excess number of permanent migrants as compared with the social optimum i.e.* $n_P^* > m_P$.

PROOF: See Appendix A.

The intuition for the above result stems from the fact that by increasing the number of permanent migrants, the marginal cultural cost of admitting an extra migrant is raised. Thus the cultural impact of making temporary migrants permanent is now bigger. Since the politician cares (partially) about the welfare of the citizen voter, his incentive constraint gets tightened as a result. In other words, as the marginal cultural cost of immigration goes up, the politician becomes less likely to accept the lobby's bribe to retain the temporary migrants. Thus the permanent migrants also play a deterrent role in reducing the politician's incentive problem with respect to temporary migrants. It is this additional deterrence effect that causes the citizens to choose permanent migrants beyond their socially optimal level. Even taken together, it may result in not all

v productive opportunities getting filled, especially when the intertemporal control of politicians is difficult. While (14) in Appendix A gives a sufficient condition for overall inefficiency here, intuitively this is likely to be the case when θ (the relative weight that the politician puts on personal rents) is high.

How is this level of permanent migration affected by the various parameters? This is analyzed in the following corollary to proposition 3.

Corollary 2 *The level of permanent migration n_p^* decreases with (i) a rise in the initial wage cost w_0, or (ii) an increase in the cultural cost of temporary migration c_0. The effect of a change in the inter-temporal productivity gain s or in the firm's bargaining strength β or in the degree of labor market mobility γ_1 on the level of permanent migration is ambiguous.*

PROOF: See Appendix A.

The intuition for the ambiguous comparative static results stems from the fact that permanent migrants impact both the incentive constraint for politicians as well as the overall surplus. Increases in factors such as firm-specific productivity s, or in the mobility costs γ_1, which raise firm profitability cause the firms to lobby politicians much more aggressively to retain the temporary workers. As noted before, by raising the marginal cultural cost, permanent migrants help to tighten the politician's incentive constraint. When the incentives are more skewed, as is the case when firm profitability is higher, the incentive gain from bringing in more permanent migrants is not as high. This calculation encourages a reduction in the number of permanent migrants brought in when s or γ_1 is higher. On the other hand, by raising the lifetime surplus from any permanent migrant, an increase in s or γ_1 suggests an increase in their number. These effects go in opposite directions, and thus their overall impact on the number of permanent migrants depends on which effect dominates.

Skill composition and type of immigration: In the model above, all workers are identical and treated identically by the government in terms of the repatriation policy. However, one could consider this as the model for a particular sector of the economy, with the decision being whether or not to grant permanency to the temporary workers in a particular sector. Viewing the model in this light allows us to discuss its implication for migration policy in different sectors. The two factors that are central to the determination of this policy in the analysis above are (i) the intertemporal gain in productivity of a worker, $y(1+\Delta(1+\tau+\alpha e))$ and investment in enhancing the worker's productivity, and (ii) the (perceived) degree of assimilation a of the migrant worker.

Arguably, the firm-specific gain in productivity is likely to be larger for high-skilled workers. For example, suppose there is uncertainty about the quality of a worker. Such uncertainty is especially high for migrant workers, but as the firm interacts longer with the worker, it is likely to discover his true quality. The value of such knowledge is likely to be high in environments where the migrant worker operates a highly specialized piece of equipment i.e. in high-skilled sectors than in low-skilled sectors such as fruit-picking. Thus, the intensity of lobbying to retain good quality workers might be expected to be more intense in high-skilled sectors i.e. $B^{\text{willingness}}$ would be higher. Similarly, the importance of training (i.e. α) is likely to be greater is such sectors.[28]

As regards the perceived degree of assimilation a by migrants, it may also differ between high-skilled (and thus more educated) immigrants and low-skilled ones. As Hanson et al. (2009) show, the aversion to immigration is more pronounced in states where the immigrant population is less skilled. If high-skilled immigrants are considered as more likely to assimilate (i.e. have a bigger a), the cultural cost of making them permanent is lower. The implication for our model is that since the cost of deviation is less, the incentive constraint for the government is tighter for such immigrants i.e. B^{accept} will be lower.

Thus, both due to the intertemporal productivity and the cultural assimilation issues, our analysis would predict that for shortages in high-skilled jobs, the policy would favour filling them with permanent workers. Since both the lobbying is more intense as well as the cost of deviation is not as large, the government's incentive constraint (9) is harder to satisfy for temporary workers in such sectors. On the other hand, for low-skilled sectors, the reverse holds; hence, in those sectors, more of the shortages are likely to be filled with temporary migrants.

4 Migration Policy and Cultural Assimilation

Our analysis so far has taken the cultural costs to be exogenously given. In reality, the magnitude of these cultural costs imposed by migrants depends partly on the degree to which they have culturally assimilated in the host country. Despite considerable heterogeneity in the migration experience across Europe (Aleksynka and Algan, 2010), various specific measures of assimilation show a lower degree of assimilation in countries such as Greece, Austria, Netherlands and France as compared with Canada and (to a lesser degree) the United States (Vigdor, 2011). While assimilation is likely to be more difficult for immigrants migrating to countries that have historically been ethnically and

[28] Among Canadian immigrants, Park (2011) finds that the incidence of training is significantly higher in more-skilled occupations.

culturally relatively homogeneous, these broad patterns of cultural assimilation may also mirror differences in the nature of migration policy, with permanent migrants being much more important in Canada, Australia and the US than in many European countries. In this section we show how our framework can be adapted to reflect these broad differences. In doing so, we show that the greater assimilation in countries such as Canada need not be because socio-cultural fundamentals are different. Rather, it may be because of the existence of multiple cultural equilibria linking migration policy and assimilation.

We begin by observing that the migrant's willingness to imbibe the local cultural ethos and assimilate is (in part) a choice variable for the migrant and is likely to be determined by the return to this investment. From the migrant's point of view, the perceived return to investment in sociocultural assimilation is driven by two concerns. First is the expected length of time the migrant worker plans to stay, work and live in the country.[29] Since our focus here is on the length of time that the migrant spends in the country (temporary versus permanent), we primarily focus on this channel. However, before we move on, it is perhaps appropriate to mention that there is a second factor which affects investment in cultural assimilation. This occurs if natives make complementary investments in accepting and welcoming migrants. After all, social interactions are a two-way process, depending on attitudes and investments made by both migrants and natives. Indeed it is easy to see that this two-way interaction can give rise to multiple equilibria. While the possibility of multiple equilibria is relatively easy to see in the case of two-way investments by migrants and natives,[30] there is an additional more subtle argument that generates a similar outcome through its interaction with migration policy. We describe this now.

In particular, for temporary migrants a key issue is whether they can reasonably expect to be made permanent. For example, for many migrant workers in Canada, a temporary "work permit" is perceived to be a reliable stepping stone towards their permanent resident status and eventual citizenship (see Table 1 for additional examples). Therefore, if temporary migrants believe that

[29] Dustmann (1999) shows using German data that the degree of investment in human capital (language) depends on the length of time the migrant expects to be in the host country.

[30] If a migrant believes that natives are relatively insular and unlikely to interact meaningfully with him, then he will have diminished incentives to invest in assimilation into the local culture and may indeed prefer to spend more of his time associating with fellow migrants. On the other side, if natives believe that migrants will not invest in assimilation, they too have little to gain from making an effort to culturally interact with the migrants. This may result in a "ghetto" like equilibrium where migrants are socially segregated from natives. In contrast, if each group believes that the other will also make investments in social integration, then we have an equilibrium where there is a good degree of socio-cultural assimilation.

they have a good chance of being made permanent, then their payoff from investment in imbibing the local culture is much larger. Conversely, if they perceive themselves to be truly temporary (having to return to their home country at the end of their tenure), then such temporary migrants will have very little incentive to invest in cultural assimilation. On the other side, the decision by temporary migrants to homogenize themselves, or not, affects the natives' perceived cultural costs in making them permanent, and thereby impacts their decision of how many temporary migrants to bring in in the first place. Thus the two decisions (that by the migrants and the natives) are interdependent, resulting in the possibility of multiple equilibria.[31]

To examine this possibility, we extend our benchmark model in section 3.2.1 in a simple way by endogenizing the migrants' decision about cultural assimilation and by allowing for the possibility that some temporary migrants may be made permanent in the long run due to the possible diversity benefits to society. Specifically, temporary migrants can decide whether or not to invest in assimilation with the host country culture (e.g. by learning the local language and customs, making an effort to attend and participate in local customs etc.). We assume that if migrants incur a cost E, their level of assimilation increases from a_0 to a_1, where $a_0 < a_1$. This reduces the cost that they impose on the local society from $c(\frac{n}{1+a_0})$ to $c(\frac{n}{1+a_1})$. Temporary migrants' decision to incur this cost or not depends on their perceived probability of becoming permanent migrants in this society and their gains from such assimilation with the local culture. We denote migrants' gains from increased interaction with the locals by V, which is only realized if they stay permanently. Second, we allow for the possibility that natives may prefer some degree of cultural diversity.[32] To model this in the simplest manner, we assume that $d(n_P)$ is the diversity benefit to natives every period from bringing in n_P permanent migrants. However, apart from contributing to increased diversity, permanent migrants impose other costs on the natives as discussed before, and we still use $c(\frac{n_P}{1+a})$ to denote these costs. In all other respects the model is the same as earlier.

The timing of the game is as before, with n_T temporary migrants admitted at the beginning of each period. Each migrant decides whether or not to make the private investment in cultural

[31] Expectations of becoming permanent can also influence the migration decisions of potential migrants. By focusing on the migration policy of a single country, our analysis abstracts from issues that may arise in a model with multiple host countries competing for a limited pool of (particularly skilled) migrants. As Giordani and Ruta (forthcoming) show, such strategic interactions result in an international externality, leading to the possibility of coordination failures in immigration policy.

[32] This relaxes the assumption made in our benchmark model that permanent migrants only impose (negative) cultural costs on the natives. While a simplification, in reality natives perhaps also gain from the cultural diversity that is brought by new migrants.

assimilation with the local populace. At the end of the period, if the government succumbs to the firm lobby, all n_T are made permanent. On the other hand, if it does not succumb, then among this group of temporary migrants, n_P are made permanent. In making this decision, the government cannot observe the degree of assimilation undertaken by each individual migrant and so it chooses the n_P permanent migrants randomly from among the pool of n_T temporary migrants.[33] Thus if n_P increases or the pool of temporary migrants n_T decreases, the chance for each individual migrant to be absorbed permanently goes up.

An equilibrium for this game consists of the number of temporary migrants n_T who are brought in, investment decisions by them in cultural assimilation and the fraction of them who are admitted as permanent migrants, along with (as before) an electoral rule specifying government re-election as a function of its actions.

Under these assumptions we can show the following results, summarized in the proposition below.

Proposition 4 *If the ratio E/V is in an intermediate range, there exist multiple equilibria where, in one equilibrium, temporary migrants invest in cultural assimilation and are likely to be made permanent citizens; and in the other equilibrium, temporary migrants do not invest in cultural assimilation and are likely to remain temporary. In contrast, if E/V is sufficiently small (large), then there is a unique equilibrium, where all temporary migrants invest (do not invest, respectively) in cultural assimilation.*

The argument is the following. First, if a_i is the degree of assimilation by the temporary migrants, then the optimal number of permanent migrants requires trading off the diversity benefits against the cultural costs (ignoring productivity gains). This results in the optimal number of permanent migrants being given by:

$$d'(n_P^i) = \frac{1}{1+a_i} c'(\frac{n_P^i}{1+a_i})$$

Note that when the assimilation level a_i is high, it is optimal to admit more permanent migrants as the marginal cost that they impose are smaller. Let us denote by n_P^1 and n_P^0 the number of permanent migrants and by n_T^1 and n_T^0 the number of temporary migrants, when the migrants do and do not assimilate, respectively. Note that $n_P^0 < n_P^1$ as the costs imposed by assimilated migrants is lower.

[33] In Appendix B, we consider instead a version of the model in which "citizenship tests" are used to determine an immigrant's eligibility for permanency, with the government deciding on the degree of difficulty of the test. We show that the basic result holds under this modification of the model as well.

From each migrant's perspective, the probability of being made permanent is given by n_P^i/n_T^i and thus they incur the cost of cultural assimilation only if:

$$\frac{n_P^i}{n_T^i}V - E > 0$$

As noted before, $n_P^0 < n_P^1$. To study the impact of a_i on the number of temporary migrants to be brought in, recall from section 3 that as the cultural cost imposed by permanent migrants is lowered, the government's incentive constraint becomes harder to sustain, since deviating from the given policy does not cost as much. This point is made specifically in Corollary 1 where as a increases, n_T goes down. In the present context, since $a_1 > a_0$, it implies that $n_T^1 < n_T^0$.

Combining the two facts, $n_P^0/n_T^0 < n_P^1/n_T^1$. In other words, in the case where migrants do invest in assimilation, the pool of temporary migrants brought in every period is smaller and the number of them made permanent is higher. Thus the chance of any individual migrant being made permanent is high in this case, thus justifying their investment in assimilation in the first place. More specifically, this happens if $\frac{n_P^1}{n_T^1}V > E$. At the same time, if $E > \frac{n_P^0}{n_T^0}V$, it implies that of the large pool of temporary migrants brought in every period, too few are made permanent for any of them to invest in assimilation with the local culture. Thus, when $\frac{n_P^1}{n_T^1}V > E > \frac{n_P^0}{n_T^0}V$, we have the possibility of multiple equilibria.

On the other hand, if $\frac{n_P^0}{n_T^0}V > E$, then the only equilibrium is where everyone invests in assimilating into the local society, while at the opposite extreme, if $E > \frac{n_P^1}{n_T^1}V$, then the only equilibrium involves no assimilation by migrants, with very few temporary migrants being made permanent and most being repatriated at the end of their tenure. This completes the argument.

5 Conclusion

Aging populations, rising pension payments and labor shortages in parts of the developed world are likely to increase the debate on the shape of migration from the developing world. This paper explores a neglected channel that may prevent lowering of barriers to labor migration even in the face of greater economic gain – namely, concern about the impact on the host country's culture and identity. We showed how culture can affect both the extensive margin (i.e. size) of migration and the intensive margin (i.e. temporary versus permanent migration). Despite the potential to boost world income, the analysis here suggests that any policy aimed at encouraging

migration will face political limits driven by cultural concerns.[34] In particular we demonstrate that countries may fail to encourage worker migration even if such a policy has no distributional impact and where enforcement of policy is administratively costless. The inefficiency that arises affects both the levels of temporary and permanent migration. Furthermore, our framework also allows us to understand which countries may find it politically difficult to take advantage of the globalization of labor migration, and points out that in some cases alterations in worker-employer tying requirements can help make a greater amount of labor migration politically feasible.

While the era of substantially freer international labor migration may be a long time coming, our formal model suggests that there are several politically feasible policies that may allow at least some of the gains from labor market liberalization to be realized. This paper is but a first step in examining the impact of culture on the politics and pattern of migration policy. Many other issues remain for future work – for example, the dynamics in the process of cultural assimilation by migrants and the resulting impact on future migration policy. Should host countries deliberately choose a diverse migrant pool or focus instead on importing migrants from a particular cultural area? We leave this and much else for further exploration.

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[34] Kremer and Watt (2009) propose a policy which is designed to be both Pareto improving and politically feasible. They suggest that relaxing restrictions on the "migration of foreign private household workers can potentially (1) equalize wages among natives, (2) provide a fiscal benefit, and (3) limit the perceived impact of immigration on culture and crime." Despite its attractive features, our framework suggests caution about some of the political constraints that even such an apparently attractive program might face. The key point is that the household sector is one in which the (employer-specific) productivity of the worker naturally rises over time. For example, over time there is likely to be a household-specific increase in productivity of au pairs. By contrast, there are likely to be small differences in the productivity of workers with different amounts of experience in, say, the fast-food industry. Our model suggests, *pace* Kremer and Watt (2009), that the political feasibility of temporary migration programs might be greater in the latter sector than in the household production sector.

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Appendix A

Proofs:

Proof of Proposition 2:

Let us first consider the effect of a change in γ_0 on the largest supportable number of temporary migrants, as given by the incentive constraint (IC') :

$$n_T[(1+\theta)S_P^1(\widehat{e}_T(\gamma_0)) - (S_T(\widehat{e}_T(\gamma_0)) - t(\widehat{e}_T(\gamma_0)) - \lambda c_0)] - \lambda c(\frac{n_T}{1+a}) = \theta R \tag{10}$$

where $\widehat{e}_T(\gamma_0)$ is given by the condition: $\alpha\beta y(s+\gamma_0 g) = t'(\widehat{e}_T(\gamma_0))$. Using Figure (2), n_T will go up with an increase in γ_0 only if the left hand side of (10) decreases with a rise in γ_0. Taking the derivative of (10) with respect to γ_0 thus gives the condition: $\frac{dn_T}{d\gamma_0} \gtreqless 0$ according as:

$$2(1+\theta)\alpha(s+\gamma_1 g)\widehat{e}_T'(\gamma_0) - (1+\alpha\widehat{e}_T(\gamma_0))g \lesseqgtr 0$$
$$\Leftrightarrow 2(1+\theta)\alpha(s+\gamma_1 g)\frac{t'(\widehat{e}_T)}{t''(\widehat{e}_T)} \lesseqgtr (1+\alpha\widehat{e}_T(\gamma_0))g(s+\gamma_0 g)$$

with the latter inequality using the fact that $\widehat{e}_T'(\gamma_0) = \alpha\beta g y/t''(\widehat{e}_T)$.

The overall impact of a change in γ_0 on the objective function $n_T[S_T(\widehat{e}_T(\gamma_0)) - t(\widehat{e}_T(\gamma_0)) - \lambda c_0]$ is given by $\beta y g(1+\alpha\widehat{e}_T)n_T + [S_T(\widehat{e}_T(\gamma_0)) - t(\widehat{e}_T(\gamma_0)) - \lambda c_0]\frac{dn_T}{d\gamma_0}$. The two terms capture respectively the (increased) economic surplus effect and the impact on the politically sustainable level of migrants. If $\frac{dn_T}{d\gamma_0} > 0$ even at $\gamma_0 = 1$ (which is given by condition (7)) then the objective function is always increasing in γ_0, implying the optimal choice is for $\gamma_0 = 1$. Otherwise, the optimal choice would involve a level of $\gamma_0 < 1$, trading off the (positive) economic surplus effect against the (negative) migration-level effect.

Proof of Lemma 1:

It is useful to rewrite the problem in terms of the total number of permanent residents in the country at any point in time. Denoting this by $z(i)$ for period i, the problem becomes:

$$\max_{n_T(i), z(i)} (S_T(\widehat{e}_T) - t(\widehat{e}_T) - \lambda c_0)\sum_{k=1}^{\infty}\delta^{k-1}n_T(k)$$
$$+\sum_{k=1}^{\infty}\delta^{k-1}\{(S_P^0(\widehat{e}_P) - t(\widehat{e}_P) - \lambda c_0)z(k) - \delta\lambda c(\frac{z(k)}{1+a})\}$$

subject to the government's incentive constraint for all i:

$$(1+\theta)S_P^1(\widehat{e}_P)n_T(i) - \lambda c(\frac{n_T(i)+z(i)}{1+a})]$$
$$\leq \theta R + (S_T(\widehat{e}_T) - t(\widehat{e}_T) - \lambda c_0)\sum_{l=1}^{\infty}\delta^{l-1}n_T(i+l)$$
$$+\sum_{l=1}^{\infty}\delta^{l-1}\{(S_P^0(\widehat{e}_P) - t(\widehat{e}_P) - \lambda c_0)z(i+l) - \delta\lambda c(\frac{z(i+l)}{1+a})\}$$

and the constraint on the z's is that $z\,(i) \leq z(i+1) \leq z(i+2)$....

It is clear to see that if $(S_P^0(\widehat{e}_P) - t(\widehat{e}_P) - \lambda c_0) > \delta\lambda c'(\frac{z(i+l)}{1+a})$ for some l, it is optimal to set $z\,(i) = z(i+1) = ... = z(i+l)$, because this maximizes the value of the objective function, as well as increasing the right-hand side and lowering the left-hand side of the incentive constraint. This implies that if admitting permanent migrants raises welfare at any point, then it is optimal to admit them in the first period itself and reap the gains earlier (due to discounting). This also helps slacken the incentive constraint by raising the value from not reneging. Thus, we have that $z^*(1) = z^*(2) = z^*(3)$..., i.e. all the permanent migrants are imported in the first period itself.

Incorporating this makes the problem with respect to $n_T(i)$ identical for every period. Hence it implies that the optimum must involve $n_T^*(1) = n_T^*(2) = n_T^*(3)$....■

Proof of Proposition 3: Let us rewrite the incentive constraint when it binds:

$$(1+\theta)S_P^1(\widehat{e}_T)n_T - (S_T(\widehat{e}_T) - t(\widehat{e}_T) - \lambda c_0)n_T - \lambda[c(\frac{n_T+n_P}{1+a}) - c(\frac{n_P}{1+a})] = \theta R \qquad (11)$$

i.e. for a given level n_P, it gives a maximum supportable level of n_T as a function of n_P. Let us denote this function as $n_T(n_p)$. The left-hand side of the above equation is similar to that in figure 2 i.e. it is inverse U-shaped in n_T and its intersection with the R line gives $n_T(n_P)$. Given that $c(.)$ is convex, an increase in n_P lowers the left-hand side of the above equation and thus increases $n_T(n_P)$ i.e. $\frac{dn_T}{dn_P} > 0$.

Now, one can use $n_T(n_P)$ to rewrite the objective function in terms of only the number of permanent migrants as:

$$\max_{n_P}\frac{1}{1-\delta}(S_T(\widehat{e}_T) - t(\widehat{e}_T) - \lambda c_0)n_T(n_P) + \{S_P^0(\widehat{e}_P) - \lambda c_0 + \frac{\delta}{1-\delta}S_P^1(\widehat{e}_P)\}n_P - \frac{\delta}{1-\delta}\lambda c(\frac{n_P}{1+a})$$

with the attendant first-order condition:

$$(S_T(\widehat{e}_T) - t(\widehat{e}_T) - \lambda c_0)n_T'(n_P) + \{(1-\delta)S_P^0(\widehat{e}_P) + \delta S_P^1(\widehat{e}_P) - (1-\delta)\lambda c_0\} - \frac{\delta\lambda}{1+a}c'(\frac{n_P}{1+a}) = 0 \quad (12)$$

Since $n_T'(n_P) > 0$ and by assumption 2, $S_T(\widehat{e}_T) - t(\widehat{e}_T) - \lambda c_0 > 0$, it implies that:

$$(1-\delta)S_P^0(\widehat{e}_P) + \delta S_P^1(\widehat{e}_P) - \delta\lambda[\frac{1}{1+a}c'(\frac{n_P}{1+a}) - c_0] < \lambda c_0 < S_T(\widehat{e}_T) - t(\widehat{e}_T)$$

with the latter inequality following from assumption 2.

At the social optimum point given by (3): $(1-\delta)S_P^0(\widehat{e}_P) + \delta S_P^1(\widehat{e}_P) - \delta\lambda[\frac{1}{1+a}c'(\frac{m_P}{1+a}) - c_0] = S_T(\widehat{e}_T) - t(\widehat{e}_T)$. Thus, it must be that $n_P > m_P$.

We have thus established that the number of permanent migrants n_P will be greater than the socially optimal number m_P. A related issue here is whether the *total* number of migrant workers brought in will be below the efficient level v. From (11), one can derive the expression for $n_T'(n_P)$ as:

$$\frac{dn_T}{dn_P} = \frac{\frac{\lambda}{1+a}\{c'(\frac{n_T+n_P}{1+a}) - c'(\frac{n_P}{1+a})\}}{(1+\theta)S_P^1(\widehat{e}_T) - (S_T(\widehat{e}_T) - t(\widehat{e}_T) - \lambda c_0) - \frac{\lambda}{1+a}c'(\frac{n_T+n_P}{1+a})} \tag{13}$$

which, as noted before, is positive i.e. as n_P rises, the number of supportable temporary workers also increases. Hence, there exists a value of n_P, say n_P^*, at which $n_P^* + n_T(n_P^*) = v$ i.e. the mix of permanent and (supportable) temporary workers is enough to fill all the available vacancies v. Thus a sufficient condition for overall inefficiency is that at this mix, the marginal welfare is negative i.e. the left hand side of (12) at n_P^* is negative. This condition is given by:

$$\frac{\frac{\lambda}{1+a}\{c'(\frac{v}{1+a}) - c'(\frac{n_P^*}{1+a})\}(S_T(\widehat{e}_T) - t(\widehat{e}_T) - \lambda c_0)}{(1+\theta)S_P^1(\widehat{e}_T) - (S_T(\widehat{e}_T) - t(\widehat{e}_T) - \lambda c_0) - \frac{\lambda}{1+a}c'(\frac{v}{1+a})}$$
$$+\{(1-\delta)S_P^0(\widehat{e}_P) + \delta S_P^1(\widehat{e}_P) - (1-\delta)\lambda c_0\} - \frac{\delta\lambda}{1+a}c'(\frac{n_P^*}{1+a}) < 0 \tag{14}$$

This is now the analogous condition to (6) for overall inefficiency here. Intuitively, when θ is high, the incentive-relaxing effect of increasing n_P is low i.e. $n_T'(n_P)$ is small. In this case, the number of permanent migrants needed in order to ensure that the total mix of permanent and (supportable) temporary workers to fill all vacancies is so high that their combined cultural costs overwhelm the economic gains.

Proof of Corollary 2:

Analysis of equation (12) shows how the level of permanent migration, n_P, is affected by the various parameters. The various parameters can affect this equation either directly or though their effect on $n_T'(n_P)$. From (13), $n_T'(n_P)$ decreases as w_0, c_0, β, s or γ_1 increases.

Returning to (12), an increase in w_0 or c_0 lowers the left-hand side both directly as well as through their negative effect on $n_T'(n_P)$; hence n_P^* falls as w_0 or c_0 increases. An increase in the parameters β, s or γ_1 have two countervailing effects: they raise the left-hand side via their direct

positive effect on the economic surplus, but at the same time lower the left-hand side through their negative effect on $n'_T(n_P)$. Thus their overall impact on the level of permanent migration depends on which effect dominates.

Appendix B

Robustness of results: Here we consider relaxing some of the simplifying assumptions of our analysis so far to examine the robustness of our basic results.

Influence of new immigrant citizens on future immigration policy: a three-period model. Consider a 3-period version of our model. The first two periods $t = 1$ and 2, are the same as the basic model, with temporary migrants being admitted at the beginning of each period and the government taking a decision on whether or not to make them permanent at the end of the period. However, any vacancies that are unfilled at the beginning of period 3 disappear. Hence the only relevant decisions to be studied are those taken in periods $t = 1, 2$ and 3. As before, elections take place at the beginning of periods 2 and 3.

We incorporate two new features in this 3-period version of our basic model in order to investigate the robustness of the results. First, instead of banning all further immigration following a deviation by the government, we allow the choice of an optimal follow-up policy in terms of the number of immigrants to be let in after such a deviation. Secondly, we incorporate the possibility that immigrants who become citizens (after being made permanent) may exert some influence on the future politics of immigration (as in Ortega (2005)). Specifically, we assume that if n immigrants are made permanent and then subsequently awarded citizenship, then with probability $\mu(n)$, the median voter is from this group, while with probability $1 - \mu(n)$, the median voter continues to be from the original group of native citizens. The natural assumption here is that $\mu(n)$ is increasing in n i.e. the influence of immigrant-citizens is increasing in their numbers. However, the general form of the function $\mu(n)$ can incorporate many other possibilities. For example, it can be that $\mu(n) = 0$ for $n < n^c$ and $\mu(n) > 0$ for $n > n^c$ i.e. immigrants can have an impact on the political process only if there are sufficiently many of them.

The crucial aspect of the immigrant-citizens is that they may differ from the natives in terms of their preferences about further immigration. Specifically, we will consider the case where the immigrant-citizens do not suffer any disutility from the presence of more immigrants. While this particular assumption is more extreme than necessary, it helps simplify the analysis and the basic

intuition is maintained under the more general assumption that immigrant-citizens suffer positive but lower disutility than the natives from the presence of more immigrants.

The rest of the game is as before, with n_1 temporary immigrants entering at the beginning of period $t = 1$, firms lobbying for their retention, and the government deciding on whether or not to make them permanent. Elections then take place at the beginning of period 2, in which the incumbent government is reelected or not, and the median voter decides how many temporary migrants to bring in in period 2. Again, the same sequence of actions is repeated in period 2, and then elections take place at the beginning of period 3. No further decisions need to be taken beyond this stage, as all unfilled vacancies disappear.

Solving the equilibrium by backward induction, we start in period $t = 3$. The only decision here is whether or not to oust the incumbent government. Since the strongest incentive can be provided by promising to not reelect the incumbent if it makes the temporary migrants from period 2 permanent, this is the optimal decision at this stage.

Going back to period $t = 2$, the number of migrants to let in depends on the outcome of the government's decision in period $t = 1$ i.e. whether the n_1 temporary immigrants were made permanent or not. Consider first the case where none of the immigrant workers from the first period were made permanent. In this case, the median voter is from the native citizens' group. In determining the number of temporary migrants n_2 to let in at this stage, he takes into account the government's incentive, which is similar to before:

$$n_2(1+\theta)S_P^1(\widehat{e}_T) - \lambda c(\frac{n_2}{1+a}) \leq \theta R \tag{15}$$

On the other hand, in the case the n_1 immigrant workers from the first period were made permanent, then with probability $\mu(n_1)$, the median voter is chosen from this group. Since he suffers no disutility from immigration, he will thus choose to fill all the remaining vacancies at that stage with migrants i.e. $n_2 = v - n_1$. On the other hand, if the median voter is from the group of native citizens, then in his choice of migrants to let in, he will again take into account the government's incentive constraint, which is given by:

$$n_2(1+\theta)S_P^1(\widehat{e}_T) - \lambda c(\frac{n_1+n_2}{1+a}) \leq \theta R \tag{16}$$

Both the above incentive constraints (15) and (16) can be depicted by figures similar to figure 2 before. Let us denote the largest n_2 that satisfies (15) as n_2^0 and that which satisfies (16) as $n_2(n_1)$. These will be the optimal follow-up immigration policies in period $t = 2$, if the median voter is from the native citizens group.

Next going back to the initial period, in computing the government's decision of whether or not to succumb to the firm lobby and retain permanently the n_1 migrant workers, it compares the payoffs from the two actions i.e. its incentive constraint is given by:

$$n_1(1+\theta)(1+\delta)S_P^1(\widehat{e}_T) - \lambda c(\frac{n_1}{1+a}) - (S_T(\widehat{e}_T) - t(\widehat{e}_T) - \lambda c_0)n_2^0$$
$$+\mu(n_1)\{(S_P^0(\widehat{e}_P) - t(\widehat{e}_P) - \lambda c_0)(v-n_1) + \delta(v-n_1)S_P^1(\widehat{e}_P) - \delta\lambda c(\frac{v}{1+a})\}$$
$$(1-\mu(n_1))\{(S_T(\widehat{e}_T) - t(\widehat{e}_T) - \lambda c_0)n_2(n_1) - \delta\lambda c(\frac{n_1}{1+a})\} \leq \theta R \qquad (17)$$

The left-hand side accounts for the consequences of a deviation by the period 1 government from making the n_1 migrants permanent. Now, this not only has an impact through the cultural costs, but also possibly on the future political process through its impact on the identity of the median voter.

Comparing this with the incentive constraint (IC') in our basic model, one can highlight three points:

Effect of optimal follow-up policies. To enable comparison with the basic version, let us eliminate the electoral effect of immigrant-citizens by assuming that the median voter is always a native-citizen, i.e., by setting $\mu(n_1) = 0$ for all n_1. Then the only difference here is that instead of committing to no future immigration in the case of a deviation by a first-period government, we now consider the case where the native citizens choose optimally the number of temporary immigrants $n_2(n_1)$ to let in in that case. Since $(S_T(\widehat{e}_T) - t(\widehat{e}_T) - \lambda c_0)n_2(n_1) > 0$, this implies that the left-hand side of the incentive constraint is now higher as compared to before. From figure 2, it implies that the choice of n_1 is now lower due to the incorporation of the optimal follow-up policies i.e. the degree of inefficiency gets exacerbated.

Threshold influence of migrant-citizens. In a classical Downsian model of politics, migrant-citizens would only have an effect on politics if the median voter was from that group i.e. if migrant-citizens were in the majority. More generally, it is likely that this group would only exert political influence only when they are in a significant enough number. This can be incorporated into the analysis above by assuming $\mu(n_1) > 0$ only for $n_1 > n^c$. Thus if n_1 is below this threshold, then the political influence of migrant-citizens will be minimal and the analysis in the basic model remains unchanged. This will be the case for example if the number of vacancies to be filled, n, is below n^c. It will also be so if the optimal choice by the native citizens for the initial period migrants is given by $n_1^* < n^c$.

Inefficiency. For the case of a more general influence function $\mu(.)$, the incentive constraint (17) is similar to that in the basic model i.e. constraint (IC'). Thus, in this case too the optimal number of temporary migrants to be let in, n_1, is given by the maximum value of n_1 that satisfies constraint (17). Thus, analogous to proposition 1, we have the following result here: If

$$v(1+\theta)(1+\delta)S_P^1(\widehat{e}_T) - \lambda c(\frac{v}{1+a}) - (S_T(\widehat{e}_T) - t(\widehat{e}_T) - \lambda c_0)n_2^0$$
$$+\delta\{vS_P^1(\widehat{e}_T) - \lambda c(\frac{v}{1+a})\} > \theta R$$

then in a world with political constraints, the equilibrium level of temporary migrants will be lower than the socially optimal level. Note that this condition for inefficiency is independent of the influence function $\mu(.)$, as we are evaluating incentive compatibility at the limiting case of where all v vacant positions are filled by temporary migrants.

Effect of "citizenship tests" on assimilation

In section 4, instead of choosing n_P permanent migrants *randomly* from among the pool of n_T temporary migrants, the analysis can be formulated equivalently in terms of setting a cutoff standard for a citizenship "exam". Those temporary migrants who pass this exam will qualify for permanent status i.e. citizenship.

Consider π_i as the probability of passing this exam when one has an assimilation level a_i, with the natural assumption that $\pi_1 > \pi_0$ i.e. migrants who are more assimilated into the local culture are more likely to pass the exam. Now, instead of choosing n_P, cutoff standards π_i will be determined by policy.

From each migrant's perspective, they incur the cost of cultural assimilation only if:

$$\Delta\pi V - E > 0$$

where $\Delta\pi = \pi_1 - \pi_0$ is the increased chances of being made permanent if one invests in local assimilation. Suppose a fraction σ of the migrants have an assimilation cost E while the remaining have no costs for assimilating. Then the fraction of temporary migrants who pass the test (and qualify to be made permanent) is given by:

$$n_P^i = [\pi_0 + \Delta\pi\{1 - \sigma + \sigma\chi(\Delta\pi V - E)\}]n_T^i \tag{18}$$

where $\chi()$ is an indicator function for whether $\Delta\pi V - E > 0$. This is in some sense the 'supply' of permanent migrants.

As before, the number of migrants which the natives desire to be made permanent is given by balancing the diversity benefits against the cultural costs:

$$d'(n_P^i) = \frac{1}{1+\overline{a}_i} c'(\frac{n_P^i}{1+\overline{a}_i}) \tag{19}$$

where $\overline{a}_i$ is the average level of assimilation by the migrants and is given by:

$$\overline{a}_i = \frac{(1-\sigma)\pi_1 a_1 + \sigma\{\chi(\Delta\pi V - E)\pi_1 a_1 + (1-\chi(\Delta\pi V - E))\pi_0 a_0\}}{(1-\sigma)\pi_1 + \sigma\{\chi(\Delta\pi V - E)\pi_1 + (1-\chi(\Delta\pi V - E))\pi_0\}}$$

The above equation determines the 'demand' for permanent migrants.

Here, in equilibrium both equations (18) and (19) must hold. The policy parameters π_i are chosen such that this happens. The policy parameter influencing migrants' assimilation decisions is the gradient in the passing-rate $\Delta\pi$. Thus we will take a fixed base passing rate without any assimilation as $\pi_0 = 0$, and consider $\Delta\pi = \pi_1$ as relative to this base rate.

In analyzing the equilibria, first consider an equilibrium where everyone invests in assimilation. In this case, from (19), the number of permanent migrants is given by: $d'(n_P^1) = \frac{1}{1+a_1} c'(\frac{n_P^1}{1+a_1})$. From (18), $\pi_1 = n_P^1/n_T^1$, where n_T^1 is as before, the optimal number of temporary migrants to bring in when their degree of assimilation is a_1. This will be an equilibrium if $\Delta\pi V - E > 0$ i.e. if $\frac{n_P^1}{n_T^1} > \frac{E}{V}$.

Next, let us consider an equilibrium with low assimilation i.e. where only those with zero costs of assimilation do so. In this case, from (19), $d'(n_P^0) = \frac{1}{1+\overline{a}} c'(\frac{n_P^0}{1+\overline{a}})$ where $\overline{a} = \frac{(1-\sigma)\pi_1 a_1 + \sigma\pi_0 a_0}{(1-\sigma)\pi_1 + \sigma\pi_0} < a_1$. From (18), $\pi_1 = \frac{n_P^0}{(1-\sigma)n_T^0}$, where n_T^0 is the optimal number of temporary migrants to bring in when their degree of assimilation is $\overline{a}$. This will be an equilibrium if $\Delta\pi V - E < 0$ i.e. if $\frac{n_P^0}{(1-\sigma)n_T^0} < \frac{E}{V}$. Thus, as before, when $\frac{n_P^1}{n_T^1} V > E > \frac{n_P^0}{(1-\sigma)n_T^0} V$, we have the possibility of multiple equilibria, and when $\frac{E}{V}$ is either below $\frac{n_P^0}{(1-\sigma)n_T^0}$ or above $\frac{n_P^1}{n_T^1}$, there is a unique equilibrium.