

1. Introduction

Restrictions on movement of low-skilled workers to richer countries are arguably the most important distortion in the world economy and the most harmful to the world's poor. Klein and Ventura (2004), for example, estimate that the removal of immigration restrictions in OECD countries could increase world output by up to 172%.² Yet despite calls for freer mobility (perhaps, most notably from Mexico's President Fox), the elimination of immigration restrictions is not under consideration in rich countries. Indeed, resistance to low-skill migration seems to be hardening in developed countries. Many developed countries are increasingly focusing on admitting highly skilled immigrants from developing countries (Kapur, 2004), arguably with negative brain drain effects on the sending country (Bhagwati and Hamada, 1974; Haque and Kim, 1995; Miyagiwa, 1991).

High-income countries limit migration, particularly of low-skilled workers, due to concerns that immigration of low-skilled workers would (1) exacerbate inequality among natives, (2) create a burden on the welfare state, and (3) change native culture and increase crime.

In standard models, in which low and high-skilled workers are complements, migration by low-skilled immigrants lowers wages for low-skilled natives, raises wages for high-skilled natives, and thus increases inequality among natives. The estimated welfare gains for the host country are typically small relative to distributional effects.

² Klein and Ventura assume that capital is mobile and that immigrants can take advantage of OECD levels of total factor productivity. Even without these favorable assumptions, Walmsley and Winters (2003) estimate that an increase of 3% of labor supply in immigration in developed countries could raise world welfare by 0.6%, half of the gains associated with complete trade liberalization. Williamson (1996) argues that 19th Century mass migration led to income convergence across today's rich countries by directly raising the wages of the migrants and by reducing labor supply in the sending countries.

Borjas (1999) estimates welfare gains to natives on the order of .01 or .02% of GDP³ and Borjas (1995) writes that “the relatively small size of the immigration surplus – particularly when compared to the very large wealth transfers caused by immigration – probably explains why the debate over immigration policy has usually focused on the potentially harmful labor market impacts rather than the overall increase in native income.”

We examine a new form of low-skilled immigration and argue it may have very different effects. Women are increasingly crossing international borders to work as private household workers. A substantial proportion of “new rich” countries have explicit programs granting temporary visas that allow foreigners to work as private household workers, such as nannies and maids but restrict them to this sector. Table 1 shows that in Bahrain, Kuwait, and Saudi Arabia around 10% of the labor force or more are foreign workers in private households. In Hong Kong and Singapore, 6.8% and 7.0% of the total labor force, respectively, are foreign domestic helpers. Foreign private household workers make up at least 0.8% of the labor force in Taiwan, and immigrant workers in private households are at least 0.8% of the labor force in Israel. Non-Greek, non-EU employees in private households constitute about 1% of the labor force in Greece.

Women are also traveling from new EU member states to those older EU member states that have not delayed opening their labor markets: the U.K., Ireland, and Sweden. 427,000 people from Eastern European countries that joined the EU just over 2 years ago have received rights to work in Britain; anecdotal evidence suggests that many of these

³ Borjas (1999) gives a range of values depending on different assumptions about factor price elasticities. These numbers come from assuming that the price of capital is fixed, and are for changes in income, rather than welfare.

are household workers. The other EU member states are required to open their labor markets by 2011, and are also likely to see an increase in this type of migration.

Anecdotal evidence suggests that substantial numbers of foreign women work illegally as household employees in other “old rich” countries of Europe and North America. In the US 35% of women illegal immigrants reported that their first job was working in a private household (Cortes 2004). Authorities are less likely to enforce laws against hiring illegal workers when private households, rather than firms, are doing the hiring. Italy and Spain, for example, are reported to have significant numbers of foreigners working illegally as private household workers. A limited number of foreigners are working legally as private household workers in rich countries under Au Pair programs.

Whereas much less skilled migration is blocked by fears that it will increase inequality among natives, create a fiscal burden, and change native culture. We argue that 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.

When foreign workers perform services previously done within households, such as cooking, cleaning, and care for children, the sick, and the elderly, they free up native labor, particularly women’s labor that had been spent on household production, for market production. (See Cortes and Tessada, 2006). Since high-skilled natives with a higher opportunity cost of time are more likely to purchase domestic services from immigrants, native high-skilled workers will spend more time working in the labor market.

To the extent that migration of foreign private household workers leads high-skilled natives to increase labor supply to the market, wage inequality among natives is reduced. The increase in labor supply of high-skilled workers leads to a decline in their relative wage and an increase in the relative wage of complementary low-skilled native labor. By allowing women to work more flexible hours, foreign private household workers may also reduce gender disparities among high-skilled natives and help eliminate the glass ceiling.

Moreover, when high-skilled women hire immigrant private household workers and transfer their labor from home production to market work, their output becomes taxable, providing a fiscal benefit for the population, even without considering the taxes paid by the migrants themselves.

The long-run impact of Hong Kong or Singapore-style foreign private household worker programs on native culture is limited, since immigrant private household workers are typically not allowed to bring families with them on their visas. These workers are typically female, and crime is, therefore, less likely to be perceived as a problem.

We construct and calibrate a simple model to examine the economic impact of foreign private household workers on natives. We assume that high-skilled native families would use daycare centers in the absence of foreign private household workers. However, daycare centers typically do not cook or clean or admit children during holidays or when they are ill. Thus, private household workers allow their employers to supply more time to expand labor market supply on the intensive margin.

Assuming that each private household worker leads to a 20% increase in employer time to market production, immigration of 7% of the native labor force can

increase relative wages of the native low-skilled by 3.9% and native welfare by 1.2%. The effect on welfare is about 100 times the amount found by Borjas (1999). We argue that even if some foreign private household workers leak into other occupations, native low-skilled are still likely to be better off.

While immigration by foreign private household workers avoids many of the political economy obstacles of other forms of migration, it raises a new set of ethical issues and paradoxes. Under ethical norms where obligations depend on location of residence, rather than being either universal or linked to citizenship, rather than residence, foreign private household worker programs may well be considered unacceptable even if they are Pareto improving. Programs with temporary non-renewable visas might make introducing foreign private household workers more palatable. For example, existing Au Pair programs could be expanded or the requirement that Au Pair workers be students could be dropped.

The rest of the paper is structured as follows: Section 2 lays out a simple model designed to illustrate the impact of foreign private household workers on wages and welfare in the host country. Section 3 calibrates the impact of a Hong Kong or Singapore-style program in the US. Section 4 discusses ethical and policy issues related to the adoption of such programs, and section 5 concludes.

2. Model

We present a model designed to illustrate the impact of foreign private household worker migration. Subsection 2.1 sets up the model by describing households and producers. Subsection 2.2 solves the model's equilibrium conditions. We focus on parameter values for which native households would use daycare centers in the absence of foreign private

household workers, and we abstract from endogenous fertility decisions or labor/leisure tradeoffs. Our model is thus most appropriate for societies where many women are educated and can potentially work in the labor market, and where time freed up by these workers is likely to go into market work rather than leisure or increased fertility. A more complicated model might be needed in places where the fertility response is likely important, as discussed at the end of the section.

2.1. *Setup*

We assume there are three types of agents: native high-skilled workers, native low-skilled workers, and foreign private household workers. We normalize the native population to one and assume that a fraction h are high-skilled, leaving $1 - h$ the fraction of low-skilled natives. Let m denote the population of foreign private household workers, making the total population in the host country $1 + m$. Each agent is endowed with 1 unit of labor.

Agents consume two types of private consumption goods, a general good, denoted good A , and a domestic good like cooking, cleaning, or childcare, denoted good C . Consumers' utility is linear in good A . All native consumers must consume a required R units of the domestic good. The domestic good can either be self-produced, purchased from daycare centers, or purchased from private household workers. Natives also consume a public good paid for by the government as discussed later.

The production function for good A is $A = H^\beta L^{1-\beta}$ where H is high-skilled native labor, L is low-skilled native labor, and $0 < \beta < 1$. We assume immigrating foreign private household workers are legally excluded from entering this sector under the terms

of their visa, as in Hong Kong and Singapore.⁴ We will consider the case in which some foreign private household workers leak into the general economy and substitute for low-skilled workers in production of good A in section 3.

We assume there are three technologies for domestic good production: Home production, daycare centers, and private household workers. People can home produce one unit of domestic good with one unit of labor.

Daycare centers produce good C with production function $C_{dc} = kH^\beta L^{1-\beta}$. We assume daycare centers have the same factor intensity as good A . If anything this is a conservative assumption, as Kisker et al. (1991) find that 47% of teachers in US day care centers have completed college. This is considerably more than the 24.1% of workers with college degrees in the general economy (Kominski and Adams, 1994).

Daycare centers only produce certain types of the domestic good. We therefore assume there is an upper limit denoted by \bar{c} as to how much of the domestic good consumers can purchase from daycare centers. Most daycare centers are open only during limited hours, are closed on holidays, and send home sick children. Consumers employing daycare centers must still drop off and pick up their children, find alternative childcare on holidays, and care for sick children themselves. Daycare centers also do not perform other domestic tasks like cooking and cleaning.

⁴ The assumption that low-skilled immigrants and low-skilled natives are not perfect substitutes and that these types of immigrants have a comparative advantage at producing the domestic good is necessary for our results. Imperfect substitutability of immigrants and native low-skilled workers may arise due to differences in skills between these workers, or to government policies that restrict immigrants' ability to work outside the domestic sector, as in the Hong Kong foreign domestic helpers program or the US and UK Au Pair programs, or to differential enforcement of immigration restrictions across workers in different sectors. Some evidence that immigrants have a comparative advantage in domestic work is provided by the fact that in 1998 in the US, non-citizens were almost five times more likely to work in personal service – private household category as citizens. 3.6% of non-citizens were employed in those occupations as opposed to 0.7% of US citizens.⁴ 2.7% of foreign-born US residents (including naturalized citizens) work in personal service occupations. Cortes (2006) finds specifically that 25.8% of low-skilled female immigrants are employed in private households, a number much larger than for the native population.

We also assume a third type of technology for good C production, private household workers. In most of the developed world, we observe very few natives working as private household workers. In the UK in 1990, only 0.05% of the working population were employed as domestic housekeepers. In the US, only around 1% of entire employed population (including natives and non-natives) are employed in the personal services – private household industries. To account for this, we also assume that working conditions and social stigma associated with private household work cause people to dislike working in the private household sector and/or that households prefer or are more efficient at producing their own domestic good, because they know their own tastes in food, enjoy taking care of their own children, etc. This will mean that there will be a wedge between the after-tax wage of potential employers and the wage in alternative jobs open to potential employees. We model this by assuming that workers suffer disutility δ from doing private household work.

Although foreign household workers experience a utility penalty when working as private household workers, we assume that their other options are even less attractive. Thus, we assume a potentially inelastic supply of foreign private household workers. We assume that the supply of foreign private household workers is only limited by the number of visas that the host government will provide.

Foreign private household programs usually restrict immigrants to working for only one native household worker, so we assume that foreign private household workers cannot divide their labor supply among several native households. (Relaxing this assumption would magnify the impact of foreign private household worker migration.)

We assume private household workers can provide the full R units of domestic good production for a household.

The government taxes the labor income of all natives at tax rate τ and spends all tax revenue on a public good that is only enjoyed by natives. In order to abstract from debates about whether immigrants pay more in taxes than they receive from the government in social services, we assume that foreign private household workers are neither taxed nor enjoy the benefits of the government good. (In fact, foreign private household workers are most likely to be net contributors to the welfare system.)

Natives inelastically supply one unit of labor and face the following budget constraint:

$W_i(1 - \tau)(1 - L_C) = P_A A + P_{hw} C_{hw} + P_{dc} C_{dc}$, where W_i is the wage of the consumer ($i \in \{H, L\}$ which is described later), L_C is the amount of domestic good production households self-produce, P_A is the price of good A , P_{hw} is the price of good C produced by household workers, C_{hw} is the amount of good C purchased from household workers, P_{dc} is the price of daycare, and C_{dc} is the amount of good C purchased from daycare providers. Good A will be the numeraire, and thus $P_A = 1$. In addition, the household faces the constraint that $C_{dc} \leq \bar{c}$ and that $C_{hw} + C_{dc} + L_C = 1$.

How the household produces domestic services depends on the price of daycare services, P_{dc} , the price of private household worker services, P_{hw} , and the opportunity cost of home production of the domestic good $(1 - \tau)W_i$. Households will choose the combination of daycare services, household worker services, and own production that maximizes their consumption of good A . If households have sufficiently low wages that

$W_i(1-\tau) < P_{dc}$ and $W_i(1-\tau) < P_{hw}$, they will self-produce their entire domestic good consumption. If the opportunity cost of working is greater than the price of daycare services, $W_i(1-\tau) > P_{dc}$, but private household workers are too expensive, relative to a mix of using daycare and home production, $P_{hw}R > P_{dc}\bar{c} + W_i(1-\tau)(R-\bar{c})$, then households will fully utilize daycare centers and self-produce the balance of their domestic good needs. Finally, if $P_{hw} < W_i(1-\tau)$ and $P_{hw}R < P_{dc}\bar{c} + W_i(1-\tau)(R-\bar{c})$, then the household will hire a private household worker.

The model implies that high-skilled natives with a higher opportunity cost of time will be more likely to utilize private household workers. This is consistent with empirical data. In 1990, almost 18% of university educated mothers in Singapore hired domestic workers while only 15% of polytechnic educated mothers, 2% of secondary educated mothers and less than 0.2% of primary school educated mothers hired domestic workers (Singapore Census of Population 1990).

In general equilibrium, wages, and thus the use of daycare centers and private household workers, will depend on the supply of the low-skilled, the high-skilled, and immigrants restricted to private household work; the utility and productivity parameters, δ , \bar{c} , and k , and; government visa and tax policy.

2.2. *Equilibrium*

We first consider the closed economy case where no foreign private household workers are permitted in the host country. With perfect labor mobility, for someone of a given skill, wages W_i must be the same in both the good A and daycare labor markets. Furthermore, natives working as private household workers must be paid a wage of $W_i +$

δ in order to make them indifferent between working as a private household worker and working in the daycare or good A industries. Therefore, the price of the service provided by native private household workers will be $P_{hw} = \delta + W_i$ where W_i is the wage of workers of type i being hired as private household workers.

Proposition 1: *If*

Assumption A1: $h < \beta$

Assumption A2: $h > \frac{\left(\frac{1}{k}\right)^{1/\beta}}{[(1-\tau)(1-\beta)]^{1/\beta} + \left(\frac{1}{k}\right)^{1/\beta}}$ and

Assumption A3: $(1-\beta)\left(\frac{h}{1-h}\right)^\beta R - (1-\tau)\beta\left(\frac{h}{1-h}\right)^{\beta-1} (R-\bar{c}) > \frac{\bar{c}}{k} - \delta R,$

then $W_H > W_L$, $W_i(1-\tau) > P_{dc}$, and $P_{hw}R > P_{dc}\bar{c} + W_i(1-\tau)(R-\bar{c})$ for $i \in \{H, L\}$, and in the absence of immigration, all natives employ daycare centers and do not hire native private household workers. (Proof is in Appendix A).

In the subset of the parameter space defined by Assumptions A1 – A3, for each native the opportunity cost of not working is strictly greater than the cost of daycare centers, but with the required wage premium δ , no native private household workers are hired. Thus, every native fully utilizes daycare services to procure \bar{c} of the domestic good, and self-produces the remaining $R - \bar{c}$. For each native type, the amount of market labor supplied is $1 - R + \bar{c}$. Note that with both low-skilled and high-skilled making the same domestic good production decisions, the ratio of high-skilled to low-skilled labor in the economy is equal to the ratio of high-skilled to low-skilled workers in the population,

$\frac{h}{1-h}$. Furthermore, given the identical factor intensities in the production functions for good A and daycare services, the ratio of high-skilled to low-skilled labor supplied in each industry will equal this worker population ratio.

Now we consider what happens when $m < h$ foreign immigrants are given visas to enter the country and are restricted to working only as private household workers. In order to be as conservative as possible about benefits to the receiving economy of immigration, we assume foreign private household workers have full property rights in their visas and thus extract all of the surplus in bargaining with employers, making their employers indifferent between hiring them and their next best option.

Since $m < h$, only high-skilled workers will hire foreign private household workers as the reservation price of high-skilled workers for purchasing private household worker services is higher than that of low-skilled workers.

The key change induced by the entry of foreign private household workers is the ratio of high-skilled to low-skilled market labor provided. Since m high-skilled workers now hire foreign private household workers to produce the requisite R units of the domestic good, they now supply a full 1 unit of market labor, whereas the rest of the native workers still only supply $1 - R + \bar{c}$ units of market labor. The ratio of high-skill to low-skilled labor provided in both the good A market and the daycare market is now

$$\frac{h(1 - R + \bar{c}) + m(R - \bar{c})}{(1 - h)(1 - R + \bar{c})} = \frac{h}{1 - h} + \frac{m(R - \bar{c})}{(1 - h)(1 + R - \bar{c})}$$

It is now greater than the population ratio of high-skilled to low-skilled workers, and consequently high-skilled wages decrease and low-skilled wages increase relative to the case without immigration.

This change in labor prices induced by the release of high-skilled native labor from home production into the market could result in a change in behavior of those households that do not hire a foreign private household worker. However, under Assumptions A1-A3 it was optimal for all households to hire daycare and not hire native private household workers. With m foreign private household workers working for high-skilled households, low-skilled wages have increased and high-skilled wages have decreased. As long as low-skilled and high-skilled wages continue to bear the same ordinal relation, $W_H > W_L$, then under Assumptions A2 – A3 we will still have $W_i(1 - \tau) > P_{dc}$ and $P_{hw}R > P_{dc}\bar{c} + W_i(1 - \tau)(R - \bar{c})$ for $i \in \{H, L\}$ and it will continue to be optimal for households who do not hire foreign private household workers to hire daycare. We must modify Assumption A1 to ensure $W_H > W_L$ with m immigrants. The appropriately modified Assumption A1' is contained in Proposition 2.

Proposition 2: *If*

$$\textbf{Assumption A1': } h < \beta - \frac{(1 - \beta)m(R - \bar{c})}{1 - R + \bar{c}},$$

$$\textbf{Assumption A2: } h > \frac{\left(\frac{1}{k}\right)^{1/\beta}}{[(1 - \tau)(1 - \beta)]^{1/\beta} + \left(\frac{1}{k}\right)^{1/\beta}} \textit{ and}$$

$$\textbf{Assumption A3: } (1 - \beta)\left(\frac{h}{1 - h}\right)^\beta R - (1 - \tau)\beta\left(\frac{h}{1 - h}\right)^{\beta-1} (R - \bar{c}) > \frac{\bar{c}}{k} - \delta R,$$

then $W_H > W_L$, $W_i(1 - \tau) > P_{dc}$, and $P_{hw}R > P_{dc}\bar{c} + W_i(1 - \tau)(R - \bar{c})$ for $i \in \{H, L\}$, and with $m < h$ immigrants working as private household workers, m high-skilled households will hire foreign private household workers, and all other natives employ daycare centers

and do not hire native private household workers. Furthermore, high-skilled wages are decreasing in m and low-skilled wages are increasing in m :

$$W_L = (1 - \beta) \left[\frac{h}{1-h} + \frac{m(R - \bar{c})}{(1-h)(1-R + \bar{c})} \right]^\beta,$$

$$W_H = \beta \left[\frac{(1-h)(1-R + \bar{c})}{h(1-R + \bar{c}) + m(R - \bar{c})} \right]^{1-\beta},$$

$$\frac{\partial W_L}{\partial m} = (1 - \beta) \beta \left[\frac{R - \bar{c}}{(1-h)(1-R + \bar{c})} \right] \left[\frac{h}{1-h} + \frac{m(R - \bar{c})}{(1-h)(1-R + \bar{c})} \right]^{\beta-1} > 0; \text{ and}$$

$$\frac{\partial W_H}{\partial m} = -(1 - \beta) \beta \left[\frac{(1-h)(1-R + \bar{c})(R - \bar{c})}{(h(1-R + \bar{c}) + m(R - \bar{c}))^2} \right] \left[\frac{(1-h)(1-R + \bar{c})}{h(1-R + \bar{c}) + m(R - \bar{c})} \right]^{-\beta} < 0.$$

(Proof is in Appendix A).

In equilibrium a fraction of high-skilled natives employ foreign private household workers while the rest rely on daycare. Therefore, the price of foreign private household workers, P_{fhw} , is set such that the high-skilled are indifferent between hiring daycare services and a foreign private household worker. That price is

$$P_{fhw} = \frac{1}{R} \left[\frac{\bar{c}}{k} + (1 - \tau) \beta \left[\frac{(1-h)(1-R + \bar{c})}{h(1-R + \bar{c}) + m(R - \bar{c})} \right]^{1-\beta} \right].$$

Proposition 2 states that the immigration of $m < h$ foreign private household workers reduces wage inequality among natives; the release of high-skilled workers increases the wage of the low-skilled and decreases the wage of the high-skilled. Income inequality, however, may not be reduced since the gross income of the high-skilled before payments to foreign private household workers may increase with their greater market labor supply.

Once the population of foreign private household workers reaches the population of high-skilled natives, that is h , then all high-skilled natives will employ foreign private household workers. Any further increases in m will cause the price of private household workers to fall, so some low-skilled natives will also hire private household workers. This will lead to an increase in native low-skilled labor supply and a decline in their wages. Once the number of immigrants equals one, the number of natives, then all high-skilled and all low-skilled workers will employ private household workers and the ratio between the wages of high and low-skilled natives will be the same as without any immigration. Note that because tax revenue will be higher, as discussed below, natives will be strictly better off than they were before, so this would be a Pareto improving level of immigration.

The increase in welfare associated with foreign private household workers migration will be equal to the extra tax revenue collected from employers. The total amount of good A production minus payments to foreign private household workers minus any disutility penalty incurred by natives working as private household workers provides a convenient measure of native welfare if one values a dollar in the hands of all natives equally or assumes costless redistribution. (To the extent that one places a higher value on the marginal dollar of consumption for low-skill natives, or it is costly to raise revenue, welfare gains will be larger.) Welfare is, thus,:

$$Welfare = W_H [h(1 - R + \bar{c}) + m(R - \bar{c})] + W_L [(1 - h)(1 - R + \bar{c})] - p_{dc} \bar{c} - m(1 - \tau)W_H (R - \bar{c})$$

(See Appendix B for proof).

The change in welfare caused by a marginal change in immigration is

$$\frac{\partial \text{Welfare}}{\partial m} = \tau W_H (R - \bar{c}).^5$$

Thus, for small inflows of migrants, the increase in native welfare caused by the inflow of foreign private household workers is given by the increase in tax revenues from the additional market work done by the high-skilled. To understand the intuition, note that when market work is taxed and home production is not, taxation introduces a distortion as households will purchase domestic services only if the *private benefit* exceeds the private cost. However, the *social benefit* of working more hours in the market and purchasing domestic services includes the taxes paid on market labor earnings. When immigrants reduce the price of the outsourced good, this distortion can be countered, and welfare gains can be achieved. The extra taxes paid when someone switches from home production to purchasing domestic services is a pure externality and welfare gain.

Although we think the most relevant case is the one discussed above, we briefly describe the case where some natives are employed as private household workers. In the absence of immigrants, low-skilled natives will be the only native private household workers. If parameters are such that daycare centers and native private household workers both exist in equilibrium, high-skilled natives will be indifferent between utilizing daycare and hiring low-skilled natives as private household workers.

When the numbers of foreign private household workers are close to zero, high-skilled natives will utilize daycare, hire native private household workers, and hire

⁵ While immigration changes the wages of the high-skilled and low-skilled, this effect is second-order compared with the change in the supply of labor in the good *A* and daycare markets and can be ignored. Thus, this partial derivative is calculated holding wages fixed.

immigrant private household workers. For this to occur, high-skilled natives will be indifferent between hiring a PHW and a combination of daycare and home production.

Foreign private household workers will both displace native low-skilled private household work into good A production and increase the market labor supply of the high-skilled by allowing some high-skilled natives to switch from utilizing daycare centers to hiring immigrant private household workers. In equilibrium, the increases in both types of native labor will be exactly such that native high and low-skilled relative wages do not change. The amount of high-skilled labor freed by natives must be exactly offset by the displacement of low-skilled native private household workers. Otherwise either all natives will leave private household work or high-skill workers will cease using daycare centers. Increases in foreign private household workers will not affect relative wages until all native private household workers have been displaced. Once all native private household workers have been displaced, the analysis of section 2.2 will apply.⁶

To the extent that private household workers contribute to increased fertility or consumption of leisure, our calibration will overestimate the high-skilled labor response and will overestimate changes in wages and welfare. If foreign private household workers lead to higher fertility among high-skilled natives, long-run income distribution among natives' may be equalized for two reasons. First, higher fertility could increase the long-run supply of high-skill labor, at least to the extent that high-skilled parents can transmit education to their children. Second, to the extent that greater fertility among high-skill

⁶ The finding that this type of immigration has zero effect on wages when the high-skilled are using three types of domestic good production is an artifact of the two-type nature of the model, and of the assumption of no diminishing returns in home production. More generally, however, the existence of a domestic sector will stabilize wages in this range. Low-skilled wages will initially decline with an increase in foreign private household workers, until all native private household workers are displaced, and then will rise as more and more high-skilled labor is released. In a more realistic model, in which workers differed in more than just a single dimension, we conjecture that this type of immigration would lower wages of native private household workers and daycare center employees but raises wages of other low-skilled workers.

workers leads them to split their bequests and attention among more children the distribution of wealth will be equalized. (Related to the idea that private household workers may not actually increase market work is the idea that in some societies a large amount of housework is done by grandparents. To the extent that foreign private household workers would displace grandparent labor and increase grandparent leisure, our calibrations would overestimate the effect.)

The closed economy is subject to two different distortions. One is a public finance distortion from taxing market but not household labor. The other is a trade distortion due to cutting off trade in domestic services. In theory, an omniscient government could correct the pure public finance distortions without bringing in foreign private household workers. Doing so would involve subsidizing people to hire native private household workers and then implementing other taxes and transfers to achieve the desired income distribution among natives. For example, in our model, the government could make all expenditure on domestic services, including daycare centers, tax deductible, or equivalently subsidize daycare centers and private household workers. One could imagine a government doing this for daycare centers, but doing it for private household workers seems unlikely since it would make the tax code look very inegalitarian, even though it might not actually be inegalitarian given general equilibrium effects. Moreover, for some parameter values (i.e., a large enough disutility of doing private household work), even completely fixing the tax distortion will not induce natives to work as private household workers.

3. Calibration

In this section, we estimate the empirical magnitudes of the effects on wages and welfare described in the model. Subsection 3.1 discusses assumptions about key quantities.

Subsection 3.2 discusses the results, and Subsection 3.3 considers how the effects of foreign private household workers could change under alternative assumptions and if some of these workers were to “leak” into the general workforce.

3.1. Assumptions

To estimate the impact of foreign private household workers programs on relations of wages and on welfare of natives, we will first need an estimate of the amount of high-skilled labor freed up by hiring a private household worker. We will also need the native proportion of high-skilled workers, the estimated wage of high-skilled workers, and the marginal tax rate.

We present three different sources of information from which to infer reasonable estimates of the labor supply response of the high-skilled to foreign private household workers: one from Israeli labor force participation data, one from Cortes and Tessada (2006), and one from Ellwood, Wilde, and Batchelder (2004). We also present some country-level time series evidence consistent with the hypothesis that foreign private household workers are associated with high rates of female labor force participation.

Information on how the extensive margin of labor force participation varies with whether mothers have household helpers/care givers is provided by Israeli data. Table 2 shows Israeli female labor force participation rates in 2001.⁷ Overall, women with

⁷ Table 5 includes both foreign household workers and native household workers.

youngest children aged 2 to 4 who employ household helpers for more than 16 hours per week have approximately 21.6 percentage points or 29% higher labor force participation than those who do not hire care givers. Mothers with children aged 0 to 1 are almost 50% (30 percentage points) more likely to participate in the workforce if they hire a private household worker. On the other hand, women without children who hire a private household worker for more than 16 hours per week have 24% (10 percentage point) lower labor force participation. Using microdata from Israel in 2002, we can make rough estimates of the private household workers' impact on the intensive margin. Using self-reported usual weekly hours, college educated women with children under 4 who hired a private household worker had 34.4% higher reported hours worked last week⁸

These figures could be either larger or smaller than the causal effect of hiring private household workers on labor supply. To the extent that some women hiring private household workers have an unobserved taste for work and would have chosen to work regardless, the causal effect is smaller. On the other hand, to the extent that there is variation in the amount of domestic work across households, depending on the number and ages of children, the number of elderly in the household, and the ability of other adults to participate in household production, these figures are likely to underestimate the impact of private household workers on employers' labor supply. Households with more need for domestic work are more likely to hire private household workers. The effects of this bias can be seen comparing the higher gap when disaggregating women with the gap when women are not disaggregated, for example, by age of youngest child. These effects

⁸ Self-reported labor hours were 17.5% greater. These estimates come from the authors' regressions of the labor supply of college educated women with children under 5 with Israeli data from 2002. The point estimates are the coefficients on a dummy indicating whether the women employed a foreign private household worker for more than 40 hours a week.

may also be understated if private household workers free up fathers, not necessarily to enter the workforce, but to put in longer hours.

Cortes and Tessada (2006) find very big effects of immigration on female labor supply using time use data from America. In order to control for endogeneity in immigrants' choice of location, they instrument for the share of the labor force with less than high-school education using immigration patterns from 1970, arguing that social networks are important determinants of future patterns of immigration. They estimate that a 10% increase in the number of workers with less than a high school education will increase the labor supply of all women by about 10%.⁹ . The point estimate is arguably implausibly large, but the lower bound of the 10% confidence interval of the estimate implies that each immigrant in an occupation that arguably largely substitutes for domestic production increases native labor supply to the market by the equivalent of 0.34 workers¹⁰.

Even looking at time use data may lead to an underestimating in the increase in effective market labor supply associated with hiring a private household worker. High-

⁹ Khananusapkul (2004) also attempts to estimate the labor supply effect of low-skilled immigrants, but, since she lacks time-use data on the intensive margin of labor supply, she is unable to find strong results.

¹⁰ Only 12.9% of the US labor force had less than a high school education. A 10% increase in the number of people without high school education due to immigration corresponds to a 1.29% increase in the overall labor force. In the US 20.7% of all immigrants with less than a high school education find employment in industries we classify as likely to displace substantially native household production (private household services, landscaping services, childcare services, restaurant services, drinking establishments, car washes, barber shops, beauty salons, nail salons, dry cleaning and laundry, and taxi and limousine services, according to the Public Use Microdata Samples 2000). This implies that a 10% increase in the population of workers without high school education due to immigration would correspond to a $.207 \times .0129 = 0.27\%$ increase in the overall population (Cortes and Tessada (2006) assume that low-skilled immigrants and low-skilled natives are not perfect substitutes and are aggregated with a CES aggregator. For simplicity, we assume that they are perfect substitutes as their assumption will not change the figures by much).

Using Cortes and Tessada's 10% lower confidence interval for the impact on female labor means that this increase in immigration would lead to about a 0.2% increase in native, female labor supply, equivalent to a 0.09% increase in total native labor supply, which suggests that each immigrant in occupations that affect native labor supply increases native labor supply by $0.09/0.27 = 34.1\%$ of a native worker.

skilled natives using childcare centers may be unable to accept certain projects or certain occupations. It is hard to be a 40 hours a week investment banker or partner in a high-end law firm. Foreign private household workers may allow some highly educated natives to function as very highly skilled workers. Evidence consistent with the hypothesis that taking care of children leads to lower wages is provided by Ellwood, Wilde, and Batchelder (2004), who use a panel data set to estimate that high ability women suffer net hourly wage losses of 30% ten years after the birth of a child relative to counterparts who did not give birth.

This may be an underestimate of the impact of having a child on earnings, since even working mothers reduce the number of hours worked and some mothers drop out of the labor force. On the other hand, even mothers who employ private household workers will probably experience some loss of wages and earnings, and the 30% figure above may in part reflect selection.

Additional evidence that market labor supply is sensitive to the price of childcare services is provided by Blau and Robins (1988), Connelly (1992), Ribar (1995) and Kimmel (1998) who find that decreases in childcare prices increase the likelihood of mothers entering the workforce and estimate child-care price elasticities of employment from -0.74 to -0.2.

Time series evidence on labor force participation rates across countries is consistent with the hypothesis of large impacts of foreign private household worker programs on female labor force participation, at least in countries with significant numbers of educated women and social norms allowing interaction between men and women in the work place. Table 3 shows labor force participation and fertility rates for a

number of countries, some of which have large populations of foreign private household workers.¹¹ Consistent with the idea that these programs can increase female labor force participation, Hong Kong and Singapore both have high rates of female labor force participation. These rates are higher than in Korea although similar to the US and UK. Female labor force participation was not high in these countries in the 1970's, before large numbers of domestic workers from abroad began to enter the labor force, casting doubt on purely cultural explanations. Fertility rates for Hong Kong and Singapore are much lower and have fallen more quickly than in comparable countries, consistent with the view that women freed up from household work to participate in the labor market have fewer children.¹²

We consider the case in which hiring a private household worker allows one high-skilled parent to increase labor supply by 20%. This is roughly equivalent, for example, to assuming that a parent (typically a mother) can go from a 40 hour a week job with children in daycare to a 48 hour a week job with a private household worker. In some ways this seems conservative.

¹¹ One problem is that labor force participation statistics for most countries (except for Bahrain) include foreign private household workers. We estimate the female labor force participation rate without foreign private household workers for those countries by assuming the age distribution from a survey of foreign private household workers in Hong Kong in 1996 applies to the population of foreign private household workers in Hong Kong in 2000, Singapore in 2003, and Kuwait in 1995. The relevant age distribution is multiplied by the number of foreign private household workers in Hong Kong in 2000, Singapore in 2003, and Kuwait in 1995. This number is subtracted from the number of women working in each country and the total number of women in each country when calculating the female labor force participation rate. (Hong Kong Census and Statistics Department 1996)

¹²Note, however, that in the Gulf States, fertility is high and female labor force participation is low. If social norms limit female labor force participation or if households are wealthy due in large part to non-wage income, rather than high wages, then time freed up by foreign private household workers may go into leisure or increased fertility rather than into more market labor. If foreign private household workers free up time that natives devote to leisure or simply lead to more household work being done than would be done otherwise, relative wages between different classes of native workers will be unaffected by foreign private household workers.

To estimate the welfare gains and wage effects of foreign private household workers, we also need information on the share of high-skilled workers, their wages, and the deadweight loss of taxation. If one treats workers having completed a college education as high-skilled, then $h = 0.24$ for the US. Based on data from Hong Kong we assume that high-skilled workers employing private household workers earn twice the average wage in the economy.¹³ If foreign private household workers were less than 7% of the labor force, employer wages would presumably be even greater relative to the average wage as, the highest earning natives are likely the most eager to hire domestic help.

We assume high-skilled workers face a 50% marginal tax rate. In 2003, the top tax rate in the United States was 35%. After including the population-weighted highest average marginal tax rate of the 50 states (5.2%) and payroll taxes, natives who would be most likely to hire personal household workers face a marginal rate of around 51.6% (including the 7.65% of payroll taxes paid by the employer) if they are not above the social security cap and around 40% if they are.

We assume that the marginal welfare cost of a dollar collected in taxes is 1.4.¹⁴ We consider the impact of foreign private household worker migration equivalent to 7% of the native workforce, roughly the level in Hong Kong and Singapore. To convert welfare benefits from a share of wages to a share of GDP, we assume wages are 60% of GDP.

¹³ According to the Hong Kong Census and Statistics Department, in January of 1996 median monthly household income of households hiring domestic helpers in Hong Kong was 40,000 HK dollars. In the 4th quarter of 1995, median monthly household income of all HK households was 15,700 HK dollars. Ideally, we would have data on relative wages of freed-up workers as opposed to the household as a whole, but we do not have this yet, but expect to have a better data in the future.

¹⁴ Our model does not include a labor-leisure tradeoff or tax compliance and evasion costs, so this is a bit ad hoc, but will be addressed in future versions.

3.2. Results

The extra tax revenue from the increased labor supply of the employers of private household workers creates an externality benefit equal to the amount of high-skilled labor entering the labor market times the wage of high-skill workers times the tax rate times the marginal cost of funds.

In this case, if each private household worker frees up 20% of a high-skilled worker and these high-skilled workers earn twice the average wage in the economy as suggested by the Hong Kong data, and households face a marginal tax rate of 51.6%, and the marginal cost of raising one dollar in tax revenue is 1.4 dollars, then each private household worker creates an externality benefit equal to $0.2 * 0.5 * 1.4 * 2 = 0.28$ times the average wage in the economy. This implies that it is possible to raise welfare by about 1.96% of wages by admitting 7% of the labor force as foreign private household workers, taking into account only the benefits associated with the fiscal externality. This figure is given in the first column of Table 4. If we assume that wages make up 60% of GDP, welfare increases by just under 1.2% of total GDP.¹⁵ Our estimated welfare effects are thus two orders of magnitude larger than those found by Borjas (1999), who estimates that immigration of 10% of the workforce, raises national income by at most 0.01% to 0.02% when the supply of capital is perfectly elastic.

This estimate ignores the extra taxes that are levied in many private household worker programs. In Hong Kong employers of foreign domestic helpers are required to pay a levy of about 400 Hong Kong dollars a month 2.5% of the average monthly wage

¹⁵ The model does not allow for capital. To the extent that capital is mobile or otherwise adjusts over time, the estimates may be reasonable in the long run, but in the short run, overall increases in output will not be as sharp. The pattern in changes and returns to factors will depend on the patterns of complementarity and substitutability among skilled labor, unskilled labor, and capital.

which goes to the training of local workers. In Singapore employers pay a levy of about 345 Singaporean dollars a month.¹⁶ Including the marginal cost of funds, this means that the host country should expect an extra welfare benefit of $1.4 * .025 = .036$ average wages for each private household worker. With 7% immigration, this is an extra 0.25% of average wage increase in welfare, bringing the total welfare change to 2.2 % of the average wage or 1.3 % of GDP (Column 2, Table 4).

The welfare estimates have assumed that high-skilled natives receive no surplus from employing a private household worker. This is a very extreme assumption. If high-skilled natives receive a surplus of 10% over the wage they pay foreign private household workers, the total surplus to high-skilled natives employing foreign private household workers is 0.3% of the total wage bill in Hong Kong.¹⁷ Adding this to the original welfare gains gives a new total of 2.3% change in welfare relative to the total wage bill or 1.4% of GDP. (See Table 4, column 3).

We can do a similar calculation for wages. Under a CES production function, the effect of foreign private household workers on relative wages of native low-skilled and native high-skilled depends on the proportionate increase in each type of labor supply. Suppose again that each private household worker frees up 20% of a high-skilled worker.

If 7% of the labor force consists of foreign household workers, high skilled labor increases by $.2 \times 7\% = 1.4$ percentage points. Given that high-skilled natives make up

¹⁶ In the United States certain categories of diplomats and international civil servants are allowed to obtain G-5 visas for private household workers. The G-5 visa holders are subject to social security taxes and to payroll taxes for unemployment insurance. However, workers on G-5 status are not eligible to collect either social security or unemployment insurance. (For comparison, the minimum wage of a domestic helper in Hong Kong is 3,270 Hong Kong dollars a month and the average basic wage in Singapore in 2002 was 1,065 Singaporean dollars a month. (*Asia Pulse, 2004; Singapore Yearbook of Manpower Statistics 2002*).

¹⁷ If total compensation (including room and board) of a foreign private household worker is \$6,540 which is 41.7% of the average wage in Hong Kong, high-skilled natives value the service at 46.3% of average wages and receive a surplus of 4.6% of average wages.

about 24% of the native labor force, high-skilled labor increases by about $1.4 / 24 = 5.8\%$. Although private household workers will displace native workers in daycare centers, because we assume that the skill intensity of daycare centers is the same as that of the general economy, the proportion of low-skilled natives displaced in daycare centers will be exactly offset by the proportion of high-skilled natives displaced in daycare centers. Under a Cobb-Douglas production function the elasticity of substitution is one and $\frac{W_L}{W_H} \approx \frac{h}{(1-h)}$. This implies that the ratio of low-skilled to high-skilled wages increases by about 5.8 %.

The Cobb-Douglas production function assumed in our model implies that the elasticity of substitution between high-skilled and low-skilled labor is one. Although this assumption may not be unreasonable, it is probably low. Katz and Murphy (1992) estimate this elasticity to be 1.41 using US data from 1963 to 1987. Krusell et al. (1997) estimate the elasticity to be 1.3 using a US dataset expanded to 1991 and an estimate of 1.67 from a model with capital-skill complementarity. Heckman, et al.(1998) estimate the elasticity to be 1.44 using a model incorporating job training. The Cobb-Douglas case provides analytical simplicity, but if the true elasticity is on the order of 1.5, we conjecture that the impact of immigration on wage differentials will be roughly two-thirds as large as those calculated in the paper. Our calibrations on the impact of foreign private household workers on tax collection should be roughly unaffected. If we assume an elasticity of substitution of 1.5, this ratio decreases by about 2/3 to 3.9%.

3.3. Robustness

In this subsection we consider robustness to the parameters above, to the assumption that workers in daycare centers have the same skill mix as the general economy, and to the possibility that foreign private household workers will leak into the general economy.

It is straightforward to conduct sensitivity analyses for the parameters above. For example, if one wanted to assume that the labor supply response of high-skilled natives was 10% rather than 20%, one would simply divide all our welfare and wage estimates by two. These effects would still be enormous.

Even under the extreme assumption that daycare centers are wholly staffed by low-skilled natives, wages of low-skill natives will rise. For daycare centers, we assume that each immigrant replaces a native daycare worker at a ratio of 5:1. (The usual staff to child ratios in daycare facilities is 1:9 (Blau 2003), but some private household workers may care for more than one child.) We also assume that 75.1% of natives who hire foreign private household workers would utilize daycare centers in the absence of migration; this is the labor force participation rate of Israeli women who do not hire household workers (see Table 3.) – We thus assume that for every 100 foreign private household workers hired, 75.1 will replace native daycare center workers, but only at a rate of 5 to 1. In this case, the increase in low-skilled labor would be $7 * 0.751 * 0.2 = 1.05$ percentage points which is about 1.42% of the low-skilled native labor force (76%). This would increase the ratio of low- to high-skilled wages by $6.1\% - 1.4\% = 4.7\%$ under a Cobb-Douglas assumption. With an elasticity of substitution of 1.5, the ratio would increase by 3.1%.

Our estimate for wage effects will be reduced to the extent that foreign private household workers leak from their programs and enter the broader workforce, and if leakage were great enough, could be overturned. Countries like Hong Kong, Singapore, and the Gulf States have adopted very strong rules to minimize leakage, but many other developed countries may be unwilling to adopt similar strict standards.¹⁸ Leakage would likely be greater in larger, more ethnically mixed societies, with liberal attitudes on civil liberties and without a national ID system.

It is straightforward to calculate the largest fraction of immigrants who can leave the foreign private household program for the general economy without reducing the relative wages or welfare of the native low-skilled. Define the variable F as the amount of high-skilled labor freed up by each private household worker. Note that if the number of low-skill immigrants leaking into the general economy for each one who remains in the foreign private household sector is $\frac{(1-h)F}{h}$, then the proportional increase in high-skilled labor from foreign private household workers is exactly equal to the increase in low-skilled labor from immigrants “leaking” into the general economy. If F is 0.2 as we have assumed before, and $h = 0.24$, then as long as fewer than 0.62 immigrants leak into the general economy for each foreign private household worker, the relative wages of the native low-skilled would increase. Even at a leakage rate of 0.62, however, low-skilled natives would experience welfare gains due to the extra tax revenue received by the government.

¹⁸In Singapore foreign domestic helpers are required to sign an agreement stipulating that they will not marry a Singaporean citizen or resident without permission from the Controller of Work Permits, that they will not become pregnant or deliver children during the validity of their work permit, and that they will not “engage in any relationship with a citizen or resident that will result in the birth of any child” (Singaporean Ministry of Manpower, 2004) Singapore conducts inspections for foreign private household workers to ensure that they have not become pregnant.

To calculate the level at which leakage offsets the fiscal gains to low-skill natives, we can assume that all extra taxes are distributed to natives proportional to the amount of taxes that they pay. If we assume that native high-skilled wages are about twice the average wage of the economy and that tax rates are roughly 50%, the extra taxation collected will be $2*F*0.5 = F$. If we assume a marginal cost of funds of 1.4, this amounts to a fiscal benefit of $1.4F$. The share of taxes that low-skilled natives pay is $(1-h) / (2*h + (1-h)) = 0.61$. Thus, the tax rebate distributed to the native low-skilled will be $0.61*F$. From the Cobb-Douglas production function, the change in low-skilled relative wages for each foreign private household worker will be the percent change in high-skilled labor, F/h , minus the percent change in native low-skilled labor, $leakage/(1-h)$ where F is again the amount of high-skilled labor freed up by each private household worker and leakage is the fraction of foreign private household workers who leak into the general economy.. Setting this equal to the low-skilled tax rebate implies that the maximum leakage rate will be $3.8F$ or 0.76 if $F = 0.2$.

Leakage could presumably be reduced by paying part of the workers' salary into an account which the worker could not access until he or she returned home. Having workers, employers, or employment agencies post a bond which they would forfeit if the workers overstayed their visas would be another possibility. Pritchett (2006) suggests making countries responsible for the return of temporary workers. A variant of this approach under which employment agencies rather than countries are responsible seems more flexible and creates incentives for multiple firms to explore ways to reduce leakage. Visas could be limited to people hired through a licensed, bonded intermediary agency. In Singapore and Hong Kong, most contracts are arranged by employment agencies, and

these would presumably develop recruiting strategies and other practices, such as hiring through networks and finding immigrants new jobs in other countries, in order to induce foreign private household workers to leave their host countries after their visa expired.

The wage consequences of leakage could be further reduced by requiring higher skill levels from foreign private household workers. 50% of Filipinas working overseas as private household workers have some college education or more compared to 34.9% in the general population. These numbers are restricted to women aged 25-44.

The model does not allow for capital. To the extent that capital is mobile or otherwise adjusts over time, the estimates may be reasonable in the long run, but in the short run, overall increases in output will not be as sharp. The pattern in changes and returns to factors will depend on the patterns of complementarity and substitutability among skilled labor, unskilled labor, and capital.

4. Paradox of Place Specific Norms

While "new rich" countries such as Kuwait, Hong Kong, and Singapore have established formal domestic helper programs, "old rich" countries generally have not done so, although many implicitly tolerate foreign private household workers working illegally. One reason for this may be that formal long-term domestic helper programs that restrict long-term residents who want to stay in the country to domestic service with no chance of citizenship may conflict with social norms in societies which require higher social obligations to long-term residents than to foreigners living abroad. This conflict is somewhat paradoxical, however, since if migration is voluntary, standard economic reasoning suggests migrants are better off. The calibration exercises suggest that

immigration can create sizeable welfare gains for the host economy. It is thus difficult to frame ethical objections to programs allowing immigration of foreign domestic helpers on consequentialist grounds. It is nonetheless clear that many would feel it would conflict with ethical norms to have a class of people living in their society for twenty or thirty years, permanently restricted to working only as private household workers and unable to bring their families to live with them.

Note that this conflict would not arise if ethical obligations were universalistic, independent of residence within national boundaries, or particularistic, but based on citizenship or on relatively immutable characteristics like race, ethnicity, or religion.¹⁹

To see the paradox created by norms that require different obligations to people depending on whether they have resided in the country for some time, suppose Americans believe that it is unfair to restrict somebody from the Philippines, who has lived in America for twenty or thirty years, to work only in the domestic sector. Suppose also that Americans will not admit more immigrants if this hurts the low-skilled natives. In this case, America would not admit low-skilled people from the Philippines, since this would either hurt low-income Americans or involve unfairly restricting the immigrants to the domestic sector. If, on the other hand, in Kuwait or Hong Kong people feel that their obligations to long-term foreign private household workers are only those specified contractually then they would then be willing to establish a foreign domestic helper program. Paradoxically, people in the Philippines will be better off if other countries follow these hypothetical Kuwaiti/Hong Kong norms than the posited American norms.

¹⁹ Such norms may be common in countries with a long history of immigration from a diverse set of countries and a conception of identity, independent of culture, ethnicity, or religion.

One view is that the Americans are merely hypocritical: they prefer more severe suffering out of sight in the Philippines, to less severe, suffering that is more visible to Americans. One might thus argue that the ethical objections to foreign private household workers are misplaced, but rather than second-guess this, we will model it by assuming that residents pay a utility penalty if long term residents have low welfare and consider the implications for policy.²⁰ If the utility penalty is greater than the externality benefit per foreign private household workers, natives will prefer not to have a long-term foreign private household workers program than to have one. An alternative would be to design programs that would not trigger the utility loss among the native population, by providing only temporary, non-renewable visas for periods less than that needed to trigger the utility penalty - for example, 3-year non-renewable visas. These programs would be similar to existing Au Pair programs, but would not be limited to students.²¹ Canada's Live-in Caregiver Program provides another model. The program admits foreign immigrants as caregivers for children and the elderly for at least two years. Caregivers are required to live-in with the family. After two years, immigrant caregivers can apply for permanent residence status. In 2001 2,624 immigrants entered Canada through this program making up about 1% of the total number of immigrants. The fact that programs already exist eases the political, legislative and administrative burden of movement in this area.

²⁰ Note that this is not an issue of time consistency because many people in multicultural rich societies would presumably not want to have a foreign private household worker program even if they could commit in advance to not admit foreign private household workers as citizens.

²¹ The US Au Pair program, administered by the Department of State, admits students between the ages of 18 to 26 into the US for one year under a J1 visa. The IRS estimates that there are around 12,000 Au Pairs in the US in any given year. In 2000 the UK admitted 12,900 people on Au Pair visas. Around 5,000 Au Pair work illegally (Anderson, 2001).

Restricting visas for foreign private household workers to be temporary and non-renewable would carry some efficiency costs in lost learning by doing and disrupted relationships between children and foreign private household workers. However, it would also provide some equity benefits relative to a policy under which foreign domestic helpers could stay indefinitely, because it would allow more people in the source country to earn money abroad for a period, save, and return home with enough capital to start a small business or buy a house. Moreover, if visas were temporary and non-renewable, workers might be more likely to assess their well being using their status in the source country as a reference point, rather than typical consumption levels in the host country. Rather than seeing themselves as worse off than those in the country where they work temporarily, they may see themselves as better off than those in their country of origin. They would be more likely to save a high proportion of their earnings and bring them back with them to their country.²² The source country is likely better off if instead of a small percentage of citizens leaving on a semi-permanent basis and earning much more than they would have at home, a much larger number of citizens leave for 2 or 3 years, make some money, and come home.

Attila Ambrus has suggested a policy that would legally allow foreign private household workers to stay in the host country and enter the general economy conditional on their first acquiring certain educational qualifications. This program would allow low-skilled immigrants to become high-skilled labor in the host country. It is also worth noting that if more than a fraction h of workers who move into the general economy become high-skilled, native low-skilled workers gain. One could imagine a modified Au

²² Ahlburg and Brown (1998) find that Samoans who migrate but intend to return home generally remit higher sums of money controlling for income and other variables.

Pair program, in which participants would not be required to be students in the country of origin, but were required to take classes and show satisfactory academic progress in the host country.

To the extent that ethical concerns relate to the well-being of the private household worker herself while in the host country, a key question is how the surplus from the relationship is divided between the foreign domestic helper, the employer, and the host country. In the model we assume that a certain number of foreign domestic helpers are admitted to the country and that once they are in the country they are free to choose their employer. In this case, wages are bid up to the reservation level for employers. However, in a number of cases, the terms of the migrants' visas require them to work for a specific employer and, in this sense, part of the property right over the visa is given to the employer. Currently, foreign domestic helper programs in Hong Kong and Singapore and the Live-in-Caregiver program in Canada, for example, require immigrants to sign a work contract before immigrating and make their legal status contingent on being employed by that specific employer. This shifts the bargaining power towards the employer and reduces the welfare of the private household worker.

Objections to foreign private worker programs may also be related to the high consumption of employers rather than the low consumption of workers. Restricting participation to employers with compelling needs (i.e. those caring for children with special needs or for the elderly or disabled) may make these programs more politically palatable.²³

²³ Hiring a foreign private household worker through Canada's foreign private household worker program requires having a child or an elderly person in the household. Hiring a foreign private household worker through Taiwan's foreign private household worker program requires having an elderly person in the

5. Conclusion

Migration of women to work as private household workers is likely to grow due to demographic, technological, and cultural trends. Improvements in transportation and remittance technologies increase the supply of foreign domestic workers, and the expanding role of women in the workplace creates more demand as does the growing burden of caring for the elderly.²⁴ As more countries join the ranks of the “new rich”, formal programs may expand. After 2011, Western Europe will be required to open its labor markets to workers from new eastern members.

As we have argued, private household worker migration addresses the key political economy issues limiting immigration in rich countries: widening native wage inequality among natives, fear of a fiscal drain, and the perceived impact on native culture and on crime.

Our calibration exercise suggests that the admission of 7% of the labor force as foreign private household workers could potentially increase welfare among natives by as much as a 1.2% increase in GDP. This effect is approximately 100 times as large as the effects estimated by Borjas. Moreover, this type of immigration could increase the ratio of low-skilled to high-skilled native wages by 3.9%.

Such programs could arguably do more good for the world's poor than existing aid programs. Remittances from migrant workers amounted to 6.4% and 17.6% of GDP in Bangladesh and El Salvador, respectively (Ahmed, 2006 and Hausmann, Rodrik, and

household over 70 or children under 6. Taiwan is considering enacting a law making it possible for a person to get a foreign private household worker if she has one of the 32 illnesses listed by the government.
²⁴ In the US, 21% of the population provides unpaid care to friends and family age 18 and older and nearly 80% of these care recipients are over fifty years old (Pandya 2004).

Velasco, 2005). If the U.S. had a foreign private household worker program the size of Hong Kong or Singapore's and if each worker saved or remitted \$5,000 annually, which seems conservative if the program were explicitly temporary, total savings and remittances to developing countries would be approximately \$40 billion, four times as large as annual US official development assistance.

Foreign private household worker programs are likely to have a number of other impacts on the sending countries. They are likely to raise the status of women in these societies by providing them with more control over resources. In general, private household workers are somewhat more educated than the typical woman in their home societies. For example, in the Philippines, eighty percent of migrating women aged 25 – 44 have a high school education compared with only sixty percent of the general population in this demographic group.²⁵ So while on the one hand it is possible that there would be some exacerbation in inequality in the sending countries due to the removal of higher skilled workers, on the other hand, this could also provide an incentive to invest in female education.

Discomfort with foreign private household worker programs in the developed world often comes with fears of abuse. However, in many countries foreign private household workers exist in large numbers illegally. This unfortunately subjects them to abuse as the lack of legal status disqualifies them from legal protection. A formal program which allowed household workers to switch employers rather than assigning them to specific employers as is common in most existing programs could greatly alleviate this problem. A formal program that enhanced the property rights over the visa

²⁵ We thank Dean Yang for this information.

held by the immigrant would make it easier for these workers to change employers and avoid abuse.

Poor workers in developing countries would be better off in the absence of immigration restrictions in the rich world. However, they are better off under private household worker programs than they would be either under the draconian immigration restrictions that characterized the rich world for much of the 20th century or under the current trend toward selectively encouraging migration by highly-skilled workers. Foreign private household workers programs would not end the system of international apartheid that keeps the world's poor walled off from the rich. But they would open a crack in the wall.

Appendix A

Proof of Proposition 1

The first order conditions and zero-profit condition in the Good A market are:

$$W_H = \beta H^{\beta-1} L^{1-\beta} \quad [1]$$

$$W_L = (1 - \beta) H^\beta L^{-\beta} \quad [2]$$

$$H^\beta L^{1-\beta} = W_H H + W_L L. \quad [3]$$

The first order conditions and zero-profit condition the daycare market are:

$$W_H = \beta P_{dc} k \hat{H}^{\beta-1} \hat{L}^{1-\beta} \quad [4]$$

$$W_L = (1 - \beta) P_{dc} k \hat{H}^\beta \hat{L}^{-\beta} \quad [5]$$

$$P_{dc} k \hat{H}^\beta \hat{L}^{1-\beta} = W_H \hat{H} + W_L \hat{L}. \quad [6]$$

If all natives hire daycare services, the total high-skilled and low-skilled market labor provided are given by:

$$\hat{H} + H = h(1 - R + \bar{c}) \quad [7]$$

$$\hat{L} + L = (1 - h)(1 - R + \bar{c}). \quad [8]$$

Dividing the FOCs in each of the markets ([2] by [1] and [5] by [4]) and equating the resulting expressions yields:

$$\frac{\hat{H}}{\hat{L}} = \frac{H}{L} = \frac{h}{1-h} \quad [9]$$

where the last equation holds by the market clearing conditions [7] and [8].

To find the condition that guarantees $W_H > W_L$, substitute for the wages using the FOCs [1] and [2], which yields:

$$h < \beta \quad [10]$$

which is Assumption A1.

Low-skilled workers will prefer hiring daycare services to home producing the entire R amount of the domestic good if $W_L(1 - \tau) > P_{dc}$. Using the zero-profit condition [6] and the FOCs [1], [2], [4], and [5], we get the price of daycare as $P_{dc} = 1/k$.

Substituting this into our condition and using [5] and [9] yield:

$$h > \frac{\left(\frac{1}{k}\right)^{1/\beta}}{[(1 - \tau)(1 - \beta)]^{1/\beta} + \left(\frac{1}{k}\right)^{1/\beta}} \quad [11]$$

which is Assumption A2. Given $W_H > W_L$, if low-skilled workers prefer hiring daycare services to home producing the entire R amount of the domestic good, the high-skilled workers will as well.

Finally, high-skilled workers will prefer using daycare to hiring a low-skill native as a private household worker if $P_{hw}R > P_{dc}\bar{c} + W_H(1 - \tau)(R - \bar{c})$. With the wage premium on household work, $P_{hw} = W_L + \delta$. Substituting this into the expression, along with

$P_{dc} = 1/k$ and using [1], [2], and [9] yields the condition:

$$(1 - \beta)\left(\frac{h}{1 - h}\right)^\beta R - (1 - \tau)\beta\left(\frac{h}{1 - h}\right)^{\beta-1} (R - \bar{c}) > \frac{\bar{c}}{k} - \delta R \quad [12]$$

which is Assumption A3. Given $W_H > W_L$, if high-skilled workers prefer hiring daycare services to hiring a native private household worker, the low-skilled workers will as well.

□.

Proof of Proposition 2

The proof of Proposition 1 showed that, in the absence of immigration, Assumptions A2 and A3 and $W_H > W_L$ imply that $W_i(1-\tau) > P_{dc}$ and $P_{hw}R > P_{dc}\bar{c} + W_i(1-\tau)(R-\bar{c})$ for $i \in \{H, L\}$. With $m < h$ immigrants working as private household workers in high-skilled households, the expressions for wages are now

$$W_L = (1-\beta) \left[\frac{h}{1-h} + \frac{m(R-\bar{c})}{(1-h)(1-R+\bar{c})} \right]^\beta \quad [13]$$

$$W_H = \beta \left[\frac{(1-h)(1-R+\bar{c})}{h(1-R+\bar{c}) + m(R-\bar{c})} \right]^{1-\beta}. \quad [14]$$

Taking the derivative of each with respect to m yields:

$$\frac{\partial W_L}{\partial m} = (1-\beta)\beta \left[\frac{R-\bar{c}}{(1-h)(1-R+\bar{c})} \right] \left[\frac{h}{1-h} + \frac{m(R-\bar{c})}{(1-h)(1-R+\bar{c})} \right]^{\beta-1} > 0 \quad [15]$$

$$\frac{\partial W_H}{\partial m} = -(1-\beta)\beta \left[\frac{(1-h)(1-R+\bar{c})(R-\bar{c})}{(h(1-R+\bar{c}) + m(R-\bar{c}))^2} \right] \left[\frac{(1-h)(1-R+\bar{c})}{h(1-R+\bar{c}) + m(R-\bar{c})} \right]^{-\beta} < 0. \quad [16]$$

Using [13] and [14], the new condition that guarantees $W_H > W_L$ is

$$h < \beta - \frac{(1-\beta)m(R-\bar{c})}{1-R+\bar{c}} \quad [17]$$

which is Assumption A1'. Since high-skilled wages are now *lower* and low-skilled wages are no *higher*, than they were without immigration, Assumption A3 remains a sufficient condition for $P_{hw}R > P_{dc}\bar{c} + W_H(1-\tau)(R-\bar{c})$, and with $W_H > W_L$,

$P_{hw}R > P_{dc}\bar{c} + W_L(1-\tau)(R-\bar{c})$ holds as well. Similarly, Assumption A2 remains a sufficient condition for $W_i(1-\tau) > P_{dc}$ for $i \in \{H, L\}$. \square .

Appendix B

Total welfare in the economy is given by the total amount of good A produced minus any payments to foreign private household workers. With m immigrants, the market clearing conditions in the labor markets are now:

$$\hat{H} + H = h(1 - R + \bar{c}) \quad [18]$$

$$\hat{L} + L = (1 - h)(1 - R + \bar{c}). \quad [19]$$

Adding the two zero-profit conditions, [3] and [6], and rearranging gives:

$$P_{dc} k \hat{H}^\beta \hat{L}^{1-\beta} + H^\beta L^{1-\beta} = W_H (\hat{H} + H) + W_L (\hat{L} + L). \quad [20]$$

Market clearing in the daycare market implies:

$$k \hat{H}^\beta \hat{L}^{1-\beta} = (1 - m) \bar{c}. \quad [21]$$

Substituting [18], [19], and [21] into [20] yields:

$$H^\beta L^{1-\beta} = W_H (h(1 - R + \bar{c})) + W_L ((1 - h)(1 - R + \bar{c})) - P_{dc} (1 - m) \bar{c}. \quad [22]$$

The total welfare in the economy is given by [22] minus payments to foreign private household workers, who are paid the reservation price of high-skilled employers. It is thus:

$$W_H [h(1 - R + \bar{c}) + m(R - \bar{c})] + W_L [(1 - h)(1 - R + \bar{c})] - P_{dc} (1 - m) \bar{c} - m [P_{dc} \bar{c} + (1 - \tau) W_H (R - \bar{c})]$$

Simplifying yields the desired result:

$$Welfare = W_H [h(1 - R + \bar{c}) + m(R - \bar{c})] + W_L [(1 - h)(1 - R + \bar{c})] - p_{dc} \bar{c} - m(1 - \tau) W_H (R - \bar{c})$$

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Table 1
Foreign Domestic Helpers

Country	Year	% Labor Force
Kuwait	1995	19.9%
Bahrain	2001	10.1%
Saudi Arabia	2002	8.9%
Singapore	2003	7.0%
Hong Kong	2003	6.8%
Greece	2001	1.0%
Taiwan	2000	0.8%
Israel	2001	0.8%
USA	1998	0.3%

Kuwait: 148,637 non-Kuwaiti's were employed as domestic servants in private households out of a total working population of 747,534 and total foreign working population 604,775. Source: 1995 Census Ministry of Planning.

Bahrain: 17,701 non-Bahrainis were employed in households out of a total working population of 212,070 and total foreign working population of 134,802. Source: Statistical Abstract of Bahrain 2002.

Saudi Arabia: 516,691 non-Saudis were employed in private households out of a total working population of 5,808,617 and a total foreign working population of 3,031,633. Source: Saudi Arabia Central Department of Statistics.

Singapore: 150,000 foreigners were employed as domestic helpers out of a total labor force of 2.15 million. Source: A General Guide on Employment of Foreign Domestic Helpers Ministry of Manpower and Ministry of Manpower.

Hong Kong: 237,105 foreigners were employed as domestic helpers out of a labor force of 3,487,100. Source: Hong Kong Annual Digest of Statistics and Hong Kong Census and Statistics Bureau.

Greece: 43,623 non-Greek and non-EU citizens were employed in private households out of a total labor force of 4.3 million and a non-Greek non-EU working population of 375,579. Source: Greek Population Census 2001 and LABORSTA.

Taiwan: 79,000 foreigners were employed as domestic helpers out of a total labor force of 9.5 million. Source: Cuts in Foreign-Labor Quotas Agreed, *United Daily News* August 1, 2000 and LABORSTA.

Israel: 18.8 thousand immigrants of 1990 and after were employed as domestic personnel in private households out of a total labor force of 2,503.5 thousand and a immigrants of 1990 and after working population of 828.4 thousand. Source: Statistical Abstract of Israel 2002.

USA: This figure is taken from the March 1998 CPS where the total number of non-citizens in the industry category Personal Services – Private Households is divided by the total number of people reporting to be working in an industry.

Table 2
Female Civilian Labor Force Participation Rates in Israel 2001

	Age of Youngest Child				Number of Children				Total		
	0-1	2-4	5-9	10-14	1	2	3	4+	w/ children	w/o children	Total
(1) Employ household help and caregiver	78.0%	89.6%	87.4%	88.8%	85.3%	89.6%	85.6%	73.5%	86.0%	44.4%	61.5%
(2) 1-15 hours per week	73.7%	89.5%	88.4%	88.5%	83.9%	90.1%	86.2%	74.1%	85.9%	48.0%	64.2%
(3) 16+ hours per week	89.9%	96.7%	77.7% ¹		86.2%	90.6%	90.1%	95.1% ¹	89.7%	31.7%	54.2%
(4) Do not employ household help and caregiver	60.3%	75.1%	77.3%	76.6%	76.6%	75.8%		49.3%	72.0%	41.9%	54.5%
(3) - (4) Difference	29.6%	21.6%	0.4%		9.6%	14.8%	90.1%	45.8%	17.7%	-10.2%	-0.3%

¹ Estimate based on population of less than 2,000.

These are the percent of women in the civilian labor force in each cell.

Source: Statistical Abstract of Israel 2002.

Table 3
Female Labor Force Participation Rates in 1970's and 2000's
Ages 25-34

Including Foreign Private Household Workers											
	Hong Kong	Singapore	Japan	Korea	US	UK ¹	Germany ²	France ³	Israel ⁴	Greece ¹	Kuwait ⁵
1970	39.6%	26.7%	46.1%	36.6%	47.5%	43.9%	53.5%	61.8%	44.0%	34.0%	12.5%
2000	80.1%	79.5%	63.9%	48.9%	76.3%	73.5%	73.3%	68.8%	58.7%	64.7%	61.1%
Difference	40.5%	52.8%	17.8%	12.3%	28.8%	29.6%	19.7%	6.9%	14.7%	30.8%	48.6%

Not Including Foreign Private Household Workers				
	Hong Kong	Singapore	Bahrain ⁶	Kuwait ⁵
1970	39.6%	26.7%	7.6%	12.5%
2000	75.5%	74.6%	47.2%	23.2%
Difference	36.0%	47.9%	39.6%	10.6%

¹ Greece, UK, and Canada 1970 data is from 1971.

² 1970 Germany data comes from Federal Republic of Germany

³ France 1970 data is from 1975.

⁴ Israel data is from 1972 to 2000 and are participation rates for females aged 18 to 34.

⁵ Kuwait data is from 1970 and 1995 and are participation rates for females aged 25 to 44.

⁶ Bahrain data is from 1971 and 2001 and are participation rates for females aged 25 to 44 which do not include foreign private household workers.

Estimations not including foreign private household workers come from assuming the age distribution from a survey of foreign private household workers in Hong Kong in 1996 applies to the population of foreign private household workers in these other countries. Assuming all foreign private household workers are female allows us to subtract the number of female foreign private household workers from the number of working native women.

Data is unavailable for Saudi Arabia, Taiwan

Source: ILO Laborsta and Statistical Abstract of Bahrain 2002.

These labor force participation rates include foreign domestic helpers.

Fertility Rates (Births per Woman)

	Hong Kong	Singapore	Japan	Korea	US	UK	Germany	France	Israel	Greece	Bahrain	Kuwait
1970	3.34	3.09	2.14	4.27	2.48	2.44	2.03	2.48	3.78	2.34	6.51	7.10
2000	1.02	1.44	1.36	1.43	2.13	1.68	1.35	1.88	2.84	1.32	2.84	2.67
Difference	-69.3%	-53.3%	-36.3%	-66.5%	-14.0%	-31.1%	-33.5%	-24.3%	-24.8%	-43.5%	-56.5%	-62.4%

Source: World Development Indicators. Data from Germany is for the unified Germany.

Table 4
Calibration of Effect of Foreign Private Household Program Admitting 7% of Labor Force on Wages and Welfare

	Base (1)	Base w/ Levy (2)	Base 10% Surplus (3)
Percent Change W_L/W_H	3.9%	3.9%	3.9%
Total Welfare Gain	1.2%	1.3%	1.4%

Notes:

Foreign private household workers free up 20% of native high-skilled labor.

Taxes are given as 50% and the MCF is 1.4

Welfare gains are the increase in income as a percentage of gross income

Proportion of native high-skilled is 24%.

National income is the percent increase in gross income accruing to natives.

Immigrants are assumed to be legally restricted to only working in the