THE GLOBAL WELFARE AND POVERTY EFFECTS OF RICH NATION IMMIGRATION BARRIERS

Scott Bradford
Brigham Young University
bradford@byu.edu

January 2012

Most rich nations maintain very tight restrictions on immigration despite widespread opening of trade and international capital flows since World War II. This paper uses a two-region, one-sector, dynastic growth model with a continuum of skills to assess the welfare effects and poverty implications of these barriers. Such a dynamic model allows me to take account of international capital flows, as well as domestic investment, which I believe have important interactions with international migration. Similar to other global studies of migration, I find that rich nation migration barriers impose huge losses on the global economy. This paper also estimates, for the first time to my knowledge, the global poverty implications of those barriers and finds that freeing migration into rich nations would reduce global poverty by at least 40% and as much as 66%. This corroborates the conclusions drawn by others that opening rich nations to freer migration may do more to reduce poverty around the world than any other policy.

I thank Al Mickens, Nathan Cook, and other participants in our session of the 2011 Western Economic Association International meetings in San Diego. I am also grateful for helpful feedback received from a November 2011 BYU R-squared seminar and from the 7th Annual International Growth and Development Conference at ISI New Delhi in December 2011. All errors are mine alone.

1 INTRODUCTION

Most nations maintain tight restrictions on immigration, despite widespread loosening of trade and international capital flows since World War II. Relatively few studies, though, have analyzed the global welfare impacts of today's large immigration barriers.

I am aware of four. Hamilton and Whalley 1984 was the pioneering study. This article used a simple, seven-region applied general equilibrium (AGE) model with one good and no trade. The authors found huge gains from completely free migration, with world GDP potentially doubling. Moses and Letnes 2004 updated the Hamilton and Whalley analysis, using the same model structure and more recent data. This article considers many different scenarios and finds a wide range of possible gains, from 6% of global GDP to more than 100%. Iregui 2005 was the first article to use a fully developed AGE model with trade to address this issue. It found that migration barriers reduce world GDP by 13% to 67%, depending on the scenario. The fourth study, Klein and Ventura 2007 takes a different approach. It uses a macro/growth model that excludes trade but, unlike the three static models mentioned above, includes dynamic effects—capital accumulation, as well as international capital flows—which play important roles in assessing how changes in migration policy affect welfare. In the end, Klein and Ventura's results land in the same ballpark: completely free migration increases global GDP anywhere from 20% to 120%, depending on the assumptions. Their paper does not break down the gains between rich and poor nations, but the first three find that poor nations suffer disproportionately from migration barriers.

Thus, the limited literature in this area implies that migration barriers impose huge losses on the world, especially on developing nations. (See Clemens 2011 for a nice overview of the literature and for recommendations concerning future research.) Because of these potentially large stakes, further work that clarifies or modifies these results should prove valuable. This paper seeks to do this by building on the two-region, one-sector model of Klein and Ventura 2007 to assess the global welfare and poverty effects of immigration barriers. To my knowledge, no one has yet examined the connection between migration and poverty within a global model. I use a one-sector growth model instead of an AGE trade model because I want to analyze poverty cleanly, while taking proper account of dynamics. Aguiar and Walmsley 2010 develops a multi-sector global AGE migration model that does include the needed dynamics, but that model only has two kinds of labor, which is not enough to examine poverty properly. One could take a two-step approach to poverty analysis, as is commonly done with AGE analyses of trade, where the results from an AGE model are plugged into a detailed poverty model with many types of households. Such an approach could be fruitful, but, in this initial attempt to assess the poverty impacts of migration barriers, I prefer to take a cleaner, more transparent approach by incorporating poverty directly into the model.

While not directly tackling this issue, a few other studies do discuss the connection between migration and poverty. For instance, Clemens et al 2009 argues that a Bangladeshi could gain more income from working for two months in a rich country than from a lifetime of micro-credit. The authors conclude that a modest increase in temporary immigration in rich nations would do more to reduce poverty than any other known anti-poverty program. While this may be true in limited settings, such a conclusion concerning **global** poverty does not necessarily follow from their analysis because they use a static, partial equilibrium model that cannot properly account for the overall effects of allowing many people to migrate from poor to rich nations. For that, one needs a dynamic, general equilibrium model, such as the one in this paper. Adams and Page 2005 provides an interesting econometric—and partial equilibrium—analysis of the connection between migration and poverty. This article finds that a 10% increase in a nation's population share of emigrants reduces poverty by 2% and that a 10% increase in per capita remittances reduces poverty by 3%. One other intriguing study in this area is Taylor and Dyer 2009. It uses a detailed general equilibrium model to analyze the effect of emigration on a single nation, Mexico. This approach could complement my very broad-brushed poverty analysis below by providing more precise estimates of the impacts on poverty in particular nations.

The model and simulations in this paper imply that rich nation immigration barriers impose large costs on the world economy, in accord with the results in the four papers described in the second paragraph of this introduction. This paper's analysis also implies that migration barriers greatly increase world poverty. It appears, then, that policy makers should give serious consideration to reaping the potentially large gains that would result from loosening migration to rich nations.

2 THE MODEL

The model I use follows Klein and Ventura 2007 and uses a one-sector dynastic growth model with three inputs—capital, labor, and land—and two regions, the rich world and the developing world. Consumers maximize a discounted, infinite stream of utilities, which depend solely on the amount consumed of the single good. Capital is freely mobile across regions, while land is fixed. Labor can move but is subject to migration barriers. While the Klein and Ventura model has either one or two types of labor, my model uses a continuum of skills.[1] Such an approach allows us to see the impact of migration on poverty directly within the model: the continuum of skills leads to a continuum of incomes across the population and thus generates within the model of a segment of the population that lives below the poverty line. Models with only one or two types of labor cannot account for poverty unless all workers of a given type are considered to be in poverty. I also depart from the Klein and Ventura model by treating migration costs in a different way. They assume that migrants suffer a temporary productivity drop when they move from the poor region to the rich region. For parsimony, I adopt a simpler approach and assume that each migrant faces a constant migration cost.

In the remainder of this section, I describe the general model in detail. Then, I specify production functions, skill distributions, and needed parameters in order to estimate the real-world impact of migration barriers on global output, wages, and poverty.

[1] Giannetti 2003 and Djajic 1989 also use a continuum of skills in migration models, and theirs have influenced mine. Grossman 1983 is a pioneering model that incorporates a continuum of skills, though that paper analyzed international trade and not migration.

2.1 Model Elements

2.1.1 Regions

The world consists of two regions, which I designate Rich (*R*) and Poor (*P*). These regions are not necessarily geographically contiguous, but, combined, they comprise the entire world economy. The two regions differ in the amounts of land available for production and in total factor productivity (TFP).

2.1.2 People

Time is discrete. Each region has a continuum of infinitely-lived workers (or dynasties). $N_{R,0}$ is the mass of residents in *R* during the initial period, which is our present day. $N_{P,0}$ is the initial mass of *P* residents. Workers can move between the regions, but there is no population growth so that the total number of workers across both regions always equals $N_{R,0} + N_{P,0}$.

2.1.3 Tastes

Each worker seeks to maximize

$$\sum_{t=0}^{\infty} \beta^t u(c_t),$$

where c_t is the amount of the single good consumed in period *t*, and $\beta \in [0,1]$ is a discount factor. $u(c_t)$ is strictly increasing, strictly concave, and differentiable, and it satisfies $\lim_{c\to 0} u'(c_t) = \infty$.

2.1.4 Techniques

In each period, each region produces a single good using capital (*K*), labor (*L*), and land (*F*) in a constant-returns-to-scale production function:

$$Y_{x,t} = A_x G\left(K_{x,t}, L_{x,t}, F_x\right), \qquad x \in \{R, P\}.$$

A_x is TFP in region *x*. The function *G* is continuously differentiable, strictly increasing in each argument, and satisfies standard Inada conditions for capital and labor. *R* is the high TFP region: $A_R > A_P$. Capital depreciates at rate $\delta \in (0,1)$ each period.

2.1.5 Factors and Their Mobility

Capital can move costlessly between the regions. Land is fixed within each region. Labor can move between the regions but must pay a cost and may be prevented from doing so by policy makers. The rest of this section describes the labor market in detail.

Each worker has a fixed, exogenous skill level. For each region, the distribution of skills across the continuum of workers native to that region is given by probability density function $f_x(s)$ with support $[s_{x,min}, s_{x,max}]$, where $s_{x,max} > s_{x,min} \geq 0$ and $x \in \{R, P\}$. During each period, each worker supplies one unit of time. His skill level determines the amount of labor that he provides each period: a worker with skill level s_i supplies s_i units of labor services each period. In each period, each region pays a wage of $w_{t,x} = MPL_{t,x} = \frac{\partial Y_{x,t}}{\partial L_{x,t}}$ per unit of labor services. A worker with skill level s_i in region x earns $w_{t,i,x} = s_i w_{t,x}$ in period t.

Each worker that chooses to migrate must pay a fixed, common migration cost of m. To avoid unneeded complications, we assume that workers are not credit constrained and that, if need be, they can borrow costlessly to pay m when they decide to move. This cost is a frictional wedge that does not generate income for anyone else in society. Future work could model more explicitly the services that people must buy in order to migrate.

To mirror reality, we assume that, initially, R restricts workers from moving into it from P. These barriers bind, meaning that the wage gap between R and P is high enough to cause workers in P to be willing to pay the migration cost and move to R if they could. Given these initial conditions, labor will only flow from P to R. This paper does not analyze flows in the other direction.

We assume that policy makers in R regulate immigration by choosing a minimum skill level for immigrants. Workers at or above this skill level can migrate freely, while workers below it cannot migrate to R.[2] This assumption reflects the fact that rich nations are much more open to skilled immigration than to unskilled immigration. Let $s_{c,t}$ denote the skill cut-off. It turns out that, in the model, the payoff to migration increases monotonically with skill, so that immigration into R always consists of all workers above a certain skill level, even if policy makers do not restrict immigration

[2] Thus, this paper does not analyze illegal immigration. In the simulations below, we take the current situation, including all illegal immigration that has occurred to date, as the starting point. We then simulate the global welfare and poverty effects of completely opening immigration, which would remove the incentive to immigrate illegally.

with a skill cut-off. Thus, if immigration were totally free of barriers, all *P* workers above a certain skill level would move to *R*, with all other *P* workers staying behind. Policy makers restrict immigration by raising the skill cut-off above that free migration skill cut-off point. In today's world of highly restricted immigration into the rich region, the model presumes that policy makers have set a very high cut-off. We then use the model to simulate open immigration by calculating the new equilibrium if the cut-off is reduced to the free immigration level. In general, if policy makers lower the cut-off in period *t* from what it was in the previous period, then the number of migrants is $N_{P,t-1} \int_{s_{c,t}}^{s_{c,t-1}} f_P(s)ds$.

This set up implies equations for labor services in the two regions. Total labor services in *R* are the sum of labor services provided by workers who start there and the labor services provided by immigrants. The former is given by $N_{R,0} \int_{s_{R,min}}^{s_{R,max}} sf_R(s)ds$. The integral portion of this expression gives the average skill level of "natives" (which includes any who may have migrated before the initial period); multiplying the average skill level by the number of workers gives the total labor services. The amount of labor services provided by immigrants is $N_{P,0}\left(1 - F_P(s_{c,t})\right) \frac{\int_{s_{c,t}}^{s_{P,max}} sf_P(s)ds}{1-F_P(s_{c,t})} =$ $N_{P,0} \int_{s_{c,t}}^{s_{P,max}} sf_P(s)ds$. The ratio on the left side gives the average skill level of those who are allowed to immigrate, while $N_{P,0}\left(1 - F_P(s_{c,t})\right)$ is the number who migrate. Thus, total labor services in the rich region are

$L_{R,t} = N_{R,0} \int_{s_{R,min}}^{s_{R,max}} s f_R(s) ds + N_{P,0} \int_{s_{c,t}}^{s_{P,max}} s f_P(s) ds$. Total labor services in the poor region are $L_{P,t} = N_{P,0} F_P(s_{c,t}) \frac{\int_{s_{P,min}}^{s_{c,t}} s f_P(s) ds}{F_P(s_{c,t})} = N_{P,0} \int_{s_{P,min}}^{s_{c,t}} s f_P(s) ds$.

2.2 Solving the Model

2.2.1 Constrained Optimization Problem for the World Economy

To determine the efficient outcome, I set up a constrained optimization problem for the whole global economy. Society allocates the income generated from production across consumption, investment, and migration costs so as to maximize utility. In particular, the best outcome will result when society chooses for each time period, current consumption, next period capital, the division of current capital across the two regions, and the division of labor across the regions so as to maximize utility for all.

Thus, the problem for society is

$$\max_{c_t^R, c_t^P, K_{R,t}, K_{P,t}, K_{R,t+1}, s_{c,t}} \sum_{t=0}^{\infty} \beta^t [N_{R,t} u(c_{R,t}) + N_{P,t} u(c_{P,t})]$$

subject to:

$$A_R G(K_{R,t}, L_{R,t}, F_R) + A_P G(K_{P,t}, L_{P,t}, F_P) \geq N_{R,t} c_t^R + N_{P,t} c_t^P + K_{t+1} - (1-\delta) K_t - m N_{P,t} \int_{s_{c,t}}^{s_{c,t-1}} f^P(s) ds. \qquad (1)$$

Also, we have

$$K_{R,t} + K_{P,t} = K_t, \tag{2}$$

and, from the discussion of migration above,

$$L_{R,t} = L_{R,t} = N_{R,0} \int_{s_{R,min}}^{s_{R,max}} sf_R(s)ds + N_{P,0} \int_{s_{c,t}}^{s_{P,max}} sf_P(s)ds, \tag{3}$$

$$L_{P,t} = N_{P,0} \int_{s_{P,min}}^{s_{c,t}} sf_P(s)ds. \tag{4}$$

<u>2.2.2 Equilibrium Conditions</u>

Substituting (2), (3), and (4) into (1), we get the following first order conditions:

$$u'(c_{x,t}) = \lambda_t, \quad x \in (R, P) \tag{5}$$

$$\beta^t \lambda_t \left[A_R G_1 (K_{R,t}, L_{R,t}, F_R) + 1 - \delta \right] + \beta^{t-1} \lambda_{t-1} = 0, \tag{6}$$

$$\beta^t \lambda_t \left[A_P G_1 (K_{P,t}, L_{P,t}, F_P) + 1 - \delta \right] + \beta^{t-1} \lambda_{t-1} = 0, \tag{7}$$

$$-\beta^t \lambda_t + \beta^{t+1} \lambda_{t+1} \left[A_R G_1 (K_{R,t}, L_{R,t}, F_R) + 1 - \delta \right] = 0, \tag{8}$$

$$\beta^t \lambda_t \left[A_R G_2(K_{R,t}, L_{R,t}, F_R) N_{P,t} \left(-s_{c,t} f_P(s_{c,t})\right) + A_P G_2(K_{P,t}, L_{P,t}, F_P) N_{P,t} s_{c,t} f_P(s_{c,t}) + m N_{P,t} f_P(s_{c,t})\right] - \beta^{t+1} \lambda_{t+1} m N_{P,t} f_P(s_{c,t}) = 0. \quad (9)$$

Equations (6) and (7) imply that $A_R G_1(K_{R,t}, L_{R,t}, F_R) = A_P G_1(K_{P,t}, L_{P,t}, F_P)$, which is the condition for optimizing the allocation of capital across regions.

In this paper, I only focus on steady state outcomes, which means that $\lambda_t = \lambda_{t+1}$. Thus, equation (8) becomes $A_R G_1(K_R, L_R, F_R) = \frac{1}{\beta} - 1 + \delta$: both marginal products of capital are locked into the quantity on the right side, as is standard in one-sector growth models.

In the steady state, (9) implies that $\frac{s_c[A_R G_2(K_R, L_R, F_R) - A_P G_2(K_P, L_P, F_P)]}{(1-\beta)} = m$. This expression has a natural interpretation. The left side is the present discounted value of permanently moving a migrant with skill level s_c from the poor region to the rich region, while the right side is the cost of moving that migrant. Policy makers should set s_c at the value for which these are equal:

$s_c = \frac{(1-\beta)m}{A_R G_2(K_R, L_R, F_R) - A_P G_2(K_P, L_P, F_P)}$.

3 ESTIMATING THE IMPACT OF RICH REGION MIGRATION BARRIERS ON GLOBAL WELFARE AND POVERTY

3.1 Specific Production Functions and Skill Distributions

I use the model developed above to simulate the effect that rich country migration barriers have on global output and poverty. To do so, I need to specify production functions and the distributions of skills for each region. I also need to choose values for needed parameters.

As Klein and Ventura 2007 explains, when there is a fixed factor, the production function must be Cobb-Douglas in order to have a balanced growth path. Thus, I specify Cobb-Douglas production functions for each region: $Y_x = A_x K_x^{\alpha} L_x^{\gamma} F_x^{1-\alpha-\gamma}$, where $x \in \{R, P\}$.

I consider two types of skill distributions: uniform and exponential. I choose these because they are the simplest continuous distributions that can be restricted to positive supports. Future work can explore other distributions, such as the chi-squared and the truncated normal.

3.2 Parameters

I follow Klein and Ventura 2007 and identify the rich region with OECD countries and the poor region with all other countries.

The CIA World Factbook implies that OECD countries have a labor force of about 600 million, while the rest of the world's labor force is about 2.4 billion. Thus, it appears that the rich countries have about 20% of the world's labor force. It turns out that this matches what Klein and Ventura assume. Setting the labor units to billions, we have $N^R = 0.6$ and $N^P = 2.4$.

Klein and Ventura cite Rao 1993, which presents data that indicates that the land-labor ratio is the same in rich and poor countries. Since the poor region has four times more people, I infer that it also has four times the land. I normalize F_R to one, so that $F_P = 4$.

I use Klein and Ventura's values for the share parameters in the production functions. Citing Gollin 2002, they argue that it is safe to assume that these parameters are the same in each region. Using Cooley and Prescott 1995, the values that they use are $\alpha = 0.317$ and $\gamma = 0.632$, implying that the share parameter for land is 0.051. They also use the Cooley and Prescott data to infer that $\delta = 0.081$.

Klein and Ventura use the Barro and Lee 2000 dataset on international education levels to infer that the average skill level in the rich region is 50% greater than that of the poor region. Thus, I assume that skills are distributed Uniform (0,1) for *P* and Uniform (0,1.5) for *R*. When using the exponential distribution, I assume that the distributions are Exp (1) for *P* and Exp (1.5) for *R*.

Using data on the capital output ratio for the world, Klein and Ventura infer that $\beta = 0.942$.

I consider two values of *m*: $10,000 and $20,000. Data from Australia indicates that it costs at least $20,000 for immigrants to move, find new housing, and get going in the job market. For other migrants, such as US immigrants from Mexico, the costs are likely lower but still significant. According to Princeton University's Mexican Migration Project, as cited in Cave 2011, just the cost of crossing from Mexico into the US was $3000 in 2009.

3.3 Quantitative Results: Implications of Free Migration

3.3.1 Uniform Skill Distribution

Given the functional forms and parameters, I use the first order conditions to simulate the complete removal of migration barriers in *R*. Of course, this is not politically feasible. The purpose of the simulation, though, is to provide estimates of how much the current regime shrinks GDP and increases poverty relative to a world without migration restrictions.

In the context of the model, complete removal of barriers means that policy makers lower s_c to its optimal value. This causes labor to move from *P* to *R*. Also, capital flows in the same direction. In addition, the more efficient allocation of labor raises the marginal product of capital, which induces more investment, which, in turn, leads to an increase in the global capital stock until its marginal product is driven back down to its steady state value. All of this works to increase global output and wages in *P* and to reduce global poverty. The migrants also benefit from the much higher wages that they can earn in *R*. Workers in *R*, though, are hurt by the increased amount of labor services available in *R*.

The top panel of Table 1 shows the changes in output, marginal products (denoted "wage": a person whose productivity is one would earn the "wage" shown in the table), and poverty under the assumption that skills are uniformly distributed in each region. These results imply that, under the current migration regime, labor is severely misallocated. Totally free migration would boost world output by 75%, or more than $50 trillion. While this may seem like a fantastically

TABLE 1							
ECONOMIC EFFECTS OF REMOVING MIGRATION BARRIERS IN RICH NATIONS							
Uniform Skill Distribution							
Poor Region: Uniform (0,1)							
Rich Region: Uniform (0,1.5)							
			Migration Cost of $10,000			**Migration Cost of $20,000**	
	Initial		**New**	**Percentage Change**		**New**	**Percentage Change**
Total World Output (US$ trillions)	74.0		130.0	75.7		130.0	75.7
Rich Region Wage (US$ thousands)	53.3		49.6	-6.9		49.6	-6.9
Poor Region Wage (US$ thousands)	18.9		31.9	68.8		29.4	55.6
Migrant Wage (US$ thousands)	18.9		49.6	162.4		49.6	162.4
Fraction in Poverty	0.106		0.035	-66.9		0.060	-43.3
Exponential Skill Distribution							
Poor Region: Exp (1)							
Rich Region: Exp (1.5)							
			Migration Cost of $10,000			**Migration Cost of $20,000**	
	Initial		**New**	**Percentage Change**		**New**	**Percentage Change**
Total World Output (US$ trillions)	74.0		129.0	74.3		129.0	74.3
Rich Region Wage (US$ thousands)	26.6		24.6	-7.5		24.6	-7.5
Poor Region Wage (US$ thousands)	9.66		15.4	59.4		14.1	46.0
Migrant Wage (US$ thousands)	9.66		24.6	154.7		24.6	154.7
Fraction in Poverty	0.187		0.063	-66.3		0.108	-42.2
Parameter Values							
Alpha	0.32						
Gamma	0.63						
Beta	0.94						
Delta	0.081						

large number, Klein and Ventura 2007, Moses and Letnes 2004, and Hamilton and Whalley 1984 all found similar results. The optimal skill cut-offs with free migration are 0.03 with a per capita migration cost of $10,000 and 0.06 with a per capita migration cost $20,000. With a uniform distribution of skills, this implies that 94-97% of the poor region workforce, or about 2 billion workers plus their dependents, would move to *R* if they could. This accords with the Klein and Ventura results. They found that free migration would cause 75-99% of the *P* labor force would move to *R*. That is unrealistic. As long, though, as total factor productivity is higher in the rich region, and capital can move along with labor, our analysis implies that the great majority of poor region workers would be economically better off, and would increase world output, if they could move freely to the North. Even if the results in this paper are off by an order of magnitude due to elements not captured by our simple model, opening up migration has great potential to boost incomes around the world. These results hold for both the low and high migration cost scenarios.

The wage changes help us to see how these gains are distributed. Migrant wages would increase by more than 150%. The wages of workers that remain in the poor region would increase by more than 50%. Workers in the rich region would lose: their wages would decline by 7%.

This model allows us, for the first time to my knowledge, to see how freer migration would affect global poverty. Setting a poverty level of $2000 per worker—which translates to less than $1000 per person if the average number of dependents per worker exceeds one—implies that about 10.6% of the workers that start in the poor region were in poverty. This is because the original poor region marginal product of labor, $w_{0,P}$, is $18,900. Thus, people with skill levels at 0.106 or below would earn less than $2000. (Each worker earns his skill level times $18,900.) With a uniform distribution of skills, that 0.106 cut-off implies that 10.6% of the people are originally below the poverty line. This is lower than other estimates of the poverty rate in the developing world, which usually exceed 20% and sometimes exceed 40%. Using a uniform distribution tends to underestimate the poverty rate. With migration costs of $10,000, free migration allows everyone with skill levels above .034 to migrate. Thus, two-thirds of workers in poverty would get to migrate out of it: free migration would have a huge impact on poverty. As shown in Table 1, if migration costs are \$20,000, the reduction in poverty would be smaller but still significant: 43%.

3.3.2 Exponential Skill Distribution

The main results when we use the more realistic exponential distribution for skills are quite close to the results with a uniform distribution, as shown in Table 1.

Assuming that skills have an exponential distribution implies that the initial poverty rate is 18%, closer to other estimates. The reduction in poverty, though, is still the same: about 2/3 with \$10,000 migration costs and about 42% with \$20,000 migration costs.

4 CONCLUSION

This paper has developed a global migration model that incorporates a continuum of skills into a one-sector growth model. Having such a continuum allows for a more realistic analysis of the labor market and for analyzing the connection between migration and poverty.

The results from this research imply that freeing migration would greatly boost world output and incomes for residents of the developing world. Such freer migration would also lead to large reductions in global poverty. Workers in the rich world, though, would suffer a hit to their incomes: about a 7% drop. This is more than the 4% drop in income in the US induced by the recent global recession. Thus, completely opening up migration is not politically feasible. Still, the potential gains are so large that even a small amount of opening would likely bring large benefits. Because of large barriers still in place, migration remains a largely uncharted frontier of globalization. The effects of freer migration probably deserve more attention from researchers and policymakers.

While I have tried to maintain parsimony in this paper, this model can easily be extended to allow for remittances, which play a big role in determining who gains from migration, and exogenous productivity growth in the poor region. Other extenstions that may prove fruitful would be to incorporate endogenous productivity growth, to model external costs that migrants might impose on the rich region, and to model migration costs more carefully. Allowing for such factors may generate more realistic results by reducing the incentive to migrate.

REFERENCES

Adams, Richard H., Jr. and John Page. 2005. "Do International Migration and Remittances Reduce Poverty in Developing Countries." *World Development*. 33(10):1645-1669.

Aguiar, Angel and Terri Walmsley. 2010. "A Dynamic General Equilibrium Model of International Migration." GTAP Resource #3387.

Barro, R.J. and J.W. Lee. 2000. "International Data on Educational Attainment: Updates and Implications." Unpublished. Harvard University.

Cave, Damien. July 6, 2011. "Better Lives for Mexicans Cut Allure of Going North." *New York Times.*

Clemens, Michael A. Summer 2011. "Economics and Emigration: Trillion Dollar Bills on the Sidewalk?" *Journal of Economic Perspectives*. 22(3):83-106.

Clemens, Michael A., Claudio E. Montenegro, and Lant Pritchett. January 2009. "The Place Premium: Wage Differences for Identical Workers Across the U.S. Border." Kennedy School Faculty Research Working Papers Series RWP09-004.

Cooley, T.F. and E. C. Prescott. 1995. "Economic Growth and Business Cycles," Chapter 1 in **T.F. Cooley, ed.** *Frontiers of Business Cycle Research*. Princeton: Princeton University Press.

Djajic, Slobodan. November 1989. "Skills and the Pattern of Migration: The Role of Qualitative and Quantitative Restrictions on International Labor Mobility". *International Economic Review*. 30(4):795-809.

Giannetti, Mariassunta. August 2003. "On the Mechanics of Migration Decisions: Skill Complementarities and Endogenous Price Differentials." *Journal of Development Economics*. 71(2):329-349.

Gollin, D. 2002. "Getting Income Shares Right." *Journal of Political Economy*. 110(2):458-474.

Grossman, Gene M. August 1983. "Partially Mobile Capital: A General Approach to Two-Sector Trade Theory." *Journal of International Economics*. 15:1-17.

Hamilton, C. and John Whalley. 1984. "Efficiency and Distributional Implications of Global Restrictions on Labour Mobility." *Journal of Development Economics*. 14:61-75.

Iregui, Ana Maria. 2005. "Efficiency Gains from the Elimination of Global Restrictions on Labour Mobility" in **George J. Borjas and Jeff Crisp, eds**, *Poverty, International Migration, and Asylum*. New York: Palgrave Macmillan.

Klein, Paul and Gustavo Ventura. 2007. "TFP Differences and the Aggregate Effects of Labor Mobility in the Long Run." *The B.E. Journal of Macroeconomics: Contributions.* 7(1), Article 10.

Moses, Jonathan W. and Bjorn Letnes. 2004. "The Economic Costs to International Labor Restrictions: Revisiting the Empirical Discussion." *World Development*. 32(10):1609-26.

Rao, D.S.P. 1993. *Intercountry Comparisons of Agricultural Output and Productivity*. Rome: Food and Agricultural Organization of the United Nations.

Taylor, J. Edward and George A. Dyer. July 2009. "Migration and the Sending Ecnonomy: A Disaggregated Rural Economy-wide Analysis." *Journal of Development Studies*. 45(6):966-989.