



Wages and health worker retention: Evidence from public sector wage reforms in Ghana[☆]

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ABSTRACT

Can governments in developing countries retain skilled health workers by raising public sector wages? We investigate this question using sudden, policy-induced wage variation in which the Government of Ghana restructured the pay scale for health workers employed by the government. We find that a 10% increase in wages decreases annual attrition from the public payroll by 1.0 percentage point (from a mean of 8 percentage points) among 20–35 year-old workers from professions that tend to migrate. As a result, the ten-year survival probability for these health workers increases from 0.43 to 0.49. The effects are concentrated among these young workers, and we do not detect effects for older workers or among categories of workers that do not tend to migrate. Given that Ghana was a major source of skilled health professional migrants during this period and that our attrition measure correlates strongly with aggregate migration, we interpret these results as evidence that wage increases in Ghana improved retention mainly through reducing international migration.

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1. Introduction

High attrition of skilled employees may generate under-staffing in the public health care systems of developing countries. Wage differentials between domestic public employment and other options are one factor that could be driving doctors, nurses, and other skilled health workers to leave the public health sector, often for jobs in high-income countries. This trend has generated concern that migration will weaken

public health systems and lead to poor health outcomes (Chen and Boufford, 2005).¹ More generally, migration of highly skilled individuals generates concern that “brain drain” will lead to lower levels of human capital and economic growth in developing countries.²

The recent literature on the economics of high-skilled migration has debated whether such migration really leads to lower average levels of human capital. Neo-classical trade-theoretic frameworks emphasize the benefits of migration (e.g., Grubel and Scott, 1966), but skilled migration can lead to a net negative “brain drain” in the presence of fiscal externalities, human capital productivity spillovers, or non-neoclassical frictions (Bhagwati and Hamada, 1974; Miyagiwa, 1991). The most recent literature has changed directions, focusing on how the possibility of migration can induce greater skill acquisition. If this effect is large enough, the opportunity to migrate can actually increase average human capital levels, leading to a “brain gain” (Mountford, 1997; Stark et al., 1997, 1998). Recent theoretical works have extended this framework and debated its merits (Mountford and Rapoport, 2011; Schiff, 2005). A large empirical literature has tested whether this “brain gain” effect appears in cross-country macro data (Beine et al., 2001, 2010, 2011; Docquier

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¹ There is an empirical literature on the health effects of medical brain drain, though it is mixed (Bhargava and Docquier, 2008; Chauvet et al., 2008; Clemens, 2007).

² For two recent reviews of the literature, see Docquier and Rapoport (2012) and Gibson and McKenzie (2011b).

et al., 2008; Easterly and Nyarko, 2009), and a few recent contributions test this hypothesis in micro data using natural experiments or instrumental variables (Batista et al., 2012; Chand and Clemens, 2008; Shrestha, 2011). In general, the literature finds evidence that migration opportunities do provide an incentive to acquire more education.

Thus, high-skill migration may be a “drain” or a “gain” for human capital in the sending country, depending on whether the incentive to acquire skills outweighs the direct effect of losing high-skilled migrants. The context, including the particular country and migrant group in question, may determine the desirability of high-skill migration. Beine et al. (2008) simulate the net effect of skilled migration on human capital across various countries. They find that more countries lose than gain and that net brain gain is most likely in countries with low migration rates and low levels of human capital. Bhargava et al. (2011) focus on physicians and find evidence that migration does generate an education incentive. However, this effect is too small to outweigh the direct drain effect for most countries. Similar to the results of Beine et al. (2008) with all high-skill migrants, they find that high physician migration rates are more likely to lead to “brain drain” while lower rates may sustain a “brain gain.” These results from the literature provide a useful background for the present study. We focus on the migration of skilled health workers from Ghana from 2003 to 2009. According to Bhargava et al. (2011), Ghana’s physician migration rate of 38% in 2004 was the 12th-highest in the world and the 2nd highest (behind Zimbabwe) among countries with more than 4 million people. Theory and empirical work indicate that positive migration rates can lead to higher levels of average human capital; however, Ghana’s extremely high physician migration rate during our sample period indicates that brain drain is more likely to be a valid concern. In such situations, public policy to discourage migration may have a productive role.

However, the literature has provided less guidance on what effects should be expected when public policy levers are applied to the migration of skilled health workers. Health workers from developing countries state that wage levels play an important role in migration decisions (Awases et al., 2003; Kangasniemi et al., 2007). However, only a few studies have attempted to measure how much actual health worker migration decisions respond to wages. As a result, we know little about whether wage increases can be a cost-effective way of reducing migration of skilled health workers. In the present study, we attempt to fill this gap by measuring how elastically the retention of Ghanaian health workers responds to wage changes. Our approach has two main strengths. First, we use detailed administrative payroll data that reports wages and retention for all publicly employed health workers in Ghana from 2003 to 2009. These data allow us to track several thousand health workers over time and measure effects that are representative of a national public health system in which migration rates had reached very high levels. Second, we observe large, plausibly exogenous changes in wages generated by the adoption of a new wage structure. While not randomly assigned, the variation in wages across time, profession (e.g., doctors, nurses, etc.), and seniority generated by this natural experiment allows us to measure the causal effect of wages on migration credibly.

To identify the impact of wages we employ a fixed effects strategy, including group effects for workers in a given grade-seniority group as well as common time effects.³ This approach tests whether the groups of health workers who received the largest raises had their attrition rates fall the most. We relax the common time trends assumption that

³ Throughout, “grade” refers to the wage grade of a worker. These generally indicate both occupation as well as large differences in seniority. For example, doctors and nurses are in different grades, but there are also 7 different grades of nurses: Staff Nurse, Senior Staff Nurse, Nursing Officer, Senior Nursing Officer, Principal Nursing Officer, Dep. Dir. of Nursing Services, and Chief Nursing Officer. Within each grade, there are also several “steps” of seniority. Our fixed effects are defined at this finest level.

fixed effects requires in three main ways. First, we allow for time fixed effects that differ across three groups: doctors, nurses, and other health workers. Second, we control for observed individual demographics and concurrent policies affecting migration of health workers both out of Ghana and into the UK. In our preferred specification, we find that wages have a strong negative effect on attrition with a 10% wage increase leading to a 1.03 percentage point decrease in annual attrition. This implies an increase of the 10-year survival rate from 43% to 49%. Third, we check whether wage increases are targeted at particular groups of health workers in a manner that would bias our estimates. We demonstrate that, if anything, large wage increases are targeted toward groups of workers with higher than average attrition trends. As a result our (negative) point estimates will be biased toward zero, if anything. Controlling for linear time trends that are specific to each grade-seniority group generates similar, though noisy, results.

We find evidence that the effect of wages on attrition is concentrated among early-career workers with no effects on older health workers. We also find evidence that doctors respond more strongly to wage increases than do other health workers. There is some evidence that men also respond to wage increases more elastically than do women, though this result is not particularly robust. Finally, we demonstrate that the effect we measure is concentrated among workers in occupations that tend to migrate and is not apparent for other workers. We take this as further evidence that wages affect attrition mainly through reducing migration.

Our results most directly relate to two strands of the existing literature. First, Bhargava and Docquier (2008) investigate the determinants of physician migration with cross-country panel data and find that migration rates are negatively associated with physician wages. Also, Okeke (2009) finds that physician migration rates respond to changes in GDP brought about by rainfall shocks. The present study is best interpreted as complementary to this existing work. Cross-country empirical studies confirm that wages and growth are correlated with physician migration across a large span of countries and time, though credibly measuring causal effects can be difficult. By focusing on one particular instance in which detailed micro data and plausibly exogenous variation in wages are available, we are able to confirm that the cross-country correlation between physician migration and wages has causal content in this instance. As noted above, we do so in a context where high migration rates make measuring the effectiveness of such a policy particularly useful. Our estimates indicate that raising wages can lead to a large reduction in health worker attrition during times of heavy migration.

Second, our results relate to the much broader literature on the role of wages in determining migration decisions for all individuals, not just doctors. Classic theory indicates that low home wages “push” migrants abroad (Borjas, 1987). However, higher income may also relax credit constraints, leading to higher migration rates (Lopez and Schiff, 1998), and increased migration has been observed in response to rainfall-induced income shocks (Yang and Choi, 2007) and randomized Progresa transfers (Angelucci, 2004). The empirical literature is large, making a full review impossible,⁴ but the present study is most similar to a pair of studies that use micro data to more credibly measure the effect of compensation on migration decisions. Yang (2006) uses variation in the real wage differential between home and destination generated by exchange rate volatility to measure the effect of real wages on return migration of temporary workers from the Philippines. He finds evidence that migrants respond to the classic “push” and “pull” effects of wages, rather than aiming for investment targets. Gibson and McKenzie (2011a) narrowly focus on the “best and brightest” from three Pacific nations to ease concerns about bias from positive selection. They argue that other factors (e.g., risk aversion, family considerations)

⁴ A large cross-country literature finds mixed results about whether the “push” effect or the credit effect dominates (Belot and Hatton, 2008; Clark et al., 2007; Docquier et al., 2007; Grogger and Hanson, 2011; Mayda, 2010; Pedersen et al., 2008).

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