

Working Paper Series



Who Wants to Work in a Rural Post?

The Role of Intrinsic Motivation, Rural Background and Faith-Based Institutions in Rwanda and Ethiopia.

Pieter Serneels,
Jose G. Montalvo,
Gunilla Pettersson,
Tomas Lievens,
Jean Damascene Butera, and
Aklilu Kidanu.

2010

UEA

University of East Anglia

Working Paper 20

DEV Working Paper 20

Who Wants to Work in a Rural Post? The Role of Intrinsic Motivation, Rural Background and Faith- Based Institutions in Rwanda and Ethiopia

Pieter Serneels, Jose G. Montalvo, Gunilla Pettersson, Tomas Lievens, Jean Damascene Butera, and Aklilu Kidanu.

First published by the School of International Development in March 2010.

This publication may be reproduced by any method without fee for teaching or nonprofit purposes, but not for resale. The papers should be cited with due acknowledgment.

This publication may be cited as:

Serneels, P., Montalvo, J., Pettersson, G., Lievens, T., Damascene Butera, J., Kidanu, A., 2010, Who Wants to Work in a Rural Post? The Role of Intrinsic Motivation, Rural Background and Faith-Based Institutions in Rwanda and Ethiopia, Working Paper 20, DEV Working Paper Series, The School of International Development, University of East Anglia, UK.

About the Authors

Pieter Serneels is a Senior Lecturer in Economics in the School of International Development at the University of East Anglia, Norwich, UK.

José García-Montalvo is Professor of Economics in the Department of Economics and Business at the Universitat Pompeu Fabra, Barcelona GSE, Spain.

Gunilla Pettersson is a research student in the Economics Department at the University of Sussex, Brighton, UK.

Tomas Lievens is a Senior Consultant at Oxford Policy Management, Oxford, UK.

Jean Damascene Butera is a health finance expert at Abt Associates, Rwanda.

Aklilu Kidanu is Director of the Miz-Hasab Research Center, Addis Ababa, Ethiopia.

Contact:

p.serneels@uea.ac.uk

School of International Development

University of East Anglia

Norwich, NR4 7TJ

United Kingdom

Tel: +44(0)1603 591508

Fax: +44(0)1603 451999

ISSN 1756-7904

About the DEV Working Paper Series

The Working Paper Series profiles research and policy work conducted by the School of International Development and International Development UEA (see below). Launched in 2007, it provides an opportunity for staff, associated researchers and fellows to disseminate original research and policy advice on a wide range of subjects. All papers are peer reviewed within the School. Recent past work, provided it meets the standards required and has contemporary significance is also welcome.

About the DEV Reports and Policy Papers

These are reports and policy papers that reproduce consultancy, applied research findings and policy work conducted by the School of International Development or International Development UEA (formerly Overseas Development Group). Launched in 2007, the reports provide an opportunity for staff, associated researchers and fellows to disseminate studies and findings on a wide range of subjects. Recent past work, provided it meets the standards required and has contemporary significance is also welcome.

About the School of International Development

The School of International Development (DEV) applies economic, social and natural sciences to the study of international development, with special emphasis on social and environmental change and poverty alleviation. DEV has a strong commitment to an interdisciplinary research and teaching approach to Development Studies and the study of poverty. This has been developed over a forty year period, bringing together researchers and students from different disciplines (economists, social scientists, natural resource scientists) into research areas and teaching teams.

The International Development UEA (formerly Overseas Development Group)

Founded in 1967, the International Development UEA is a charitable company wholly owned by the University of East Anglia, which handles the consultancy, research, and training undertaken by the faculty members in DEV and approximately 200 external consultants. Since its foundation it has provided training for professionals from more than 70 countries and completed more over 1,000 consultancy and research assignments. The International Development UEA provides DEV staff with opportunities to participate in on-going development work - real-world experience which adds a unique and valuable element to the School's teaching programmes.

For further information on DEV and the International Development UEA, please contact:

School of International Development

University of East Anglia, Norwich NR4 7TJ, United Kingdom

Tel: +44 (0)1603 592329

Fax: +44 (0)1603 451999

Email: dev.general@uea.ac.uk

Webpage: www.uea.ac.uk/dev

Acknowledgements

This study was funded by the World Bank. Montalvo acknowledges the support of SEJ2007-64340 and ICREA-Academia. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the World Bank. We would like to thank Agnes Soucat, Magnus Lindelöw, and Chris Herbst for their continuous support and for sharing their reflections.

Abstract

Most developing countries face shortages of health workers in rural areas. This has profound consequences for health service delivery, and ultimately for health outcomes. To design policies that rectify these geographic imbalances it is vital to understand what factors determine health workers' choice to work in rural areas. But empirical analysis of health worker preferences has remained limited due to the lack of data. Using unique contingent valuation data from a cohort survey of 412 nursing and medical students in Rwanda, this paper examines the determinants of future health workers' willingness to work in rural areas, as measured by rural reservation wages, using regression analysis. These data are also combined with those from an identical survey in Ethiopia to enable a two-country analysis. We find that health workers with higher intrinsic motivation – measured as the importance attached to helping the poor – as well as those who have grown up in a rural area, and Adventists who participate in a local bonding scheme are all significantly more willing to work in a rural area. The main Rwanda result for intrinsic motivation is strikingly similar to that obtained for Ethiopia and Rwanda together. The results suggest that in addition to economic incentives, intrinsic motivation and rural origin play an important role in health workers' decisions to work in a rural area, and that faith-based institutions matter.

1. Introduction

It has long been recognized that health workers form the foundation of health service delivery: their numbers, skill, and commitment are critical for the delivery of good quality health care. Renewed attention is being given to the role of geographical imbalances in the health workforce, a feature of nearly all health systems, which raises concerns about equity – in access to health care – and efficiency – whether resources are allocated where they have the biggest impact on health outcomes. The issue is particularly relevant for developing countries with limited resources and poor health outcomes.

Ultimately, the difficulties to attract and retain staff in rural facilities stem from the preferences that health workers have and the choices they make. A growing body of evidence shows that, apart from wages, other job attributes like training opportunities, career development prospects, and living and working conditions also play a role [1]. However, little attention has been given to the supply side, namely to differences in preferences among health workers, which is of interest to policymakers exploring how to address these imbalances. Policies have shifted from compulsory rural service, which is challenging to manage and enforce, to providing extra economic incentives for rural service, such as rural allowances and bonuses [2]. But there is, in the absence of rigorous evaluation, limited understanding of how effective these incentives are in attracting and

retaining health workers in rural areas. The available evidence suggests that while they can improve short term recruitment, their success for long term retention is less clear [3]. To address these difficulties, countries as diverse as the US, Australia, Thailand, and Indonesia have attempted recruitment programs that target health workers who are more committed to rural service [4]. Emerging survey evidence suggests that health workers with a rural background are more willing to work there, and more responsive to additional incentives to work in rural areas [5]. Recent theoretical work also suggests that intrinsic motivation, the tendency to do something for its own sake, can have a strong effect on job choice, and new evidence confirms this for health workers in developing countries [6]. However, most human resource policies do not take into account heterogeneity in health worker preferences. This paper examines more closely to what extent health workers differ in their willingness to work in rural areas, and the reasons for these differences.

Using unique data obtained based on contingent valuation questions, we find that intrinsic motivation, rural background, and Adventists' participation in a local bonding scheme, are strongly positively related with willingness to work in a rural area in Rwanda. These results, especially those related to intrinsic motivation, are highly consistent with those obtained from joint analysis with data from an identical survey in Ethiopia, providing new evidence that intrinsic motivation plays a key role for health workers' job choice.

The next section provides the background to the health sector in Rwanda and Ethiopia; Section 3 explains the analytical methods, while Section 4 presents the empirical results. Section 5 provides a discussion of the results.

2. Context and Data

Rwanda has in the last decade allocated significant financial resources to the health sector. Nevertheless, key indicators of service utilization and health outcomes remain well below the Sub-Saharan African average [7],[8]. Policymakers in Rwanda agree that human resources are the main constraint to improving health care, with both overall shortages and geographic imbalances being main factors. With almost 88 percent of doctors and 58 percent of nurses working in urban areas, while 82 percent of the population reside in rural areas, the distribution of health workers is highly skewed in favor of urban areas [9],[10].

The data we use come from a cohort survey conducted in 2008 by the authors, which surveyed 288 nurses and 124 medical students. Using a two stage sampling strategy to first select the schools, stratified by type of ownership, and then select the students, the

survey is broadly representative and the samples of medical and nursing students represent 53 and 77 percent of their respective cohorts. While the final year medical students come from the only medical school in Rwanda, the second and third year nursing students come from two government schools and one NGO school.

The survey uses a self-administered (supervised) questionnaire and a medical knowledge test and contains questions on job choice, economic welfare, and demographic characteristics; it also attempts to measure health worker motivation, as discussed below.

Since the government plays an important role both in the assignment of public sector health workers and in the determination of their wages, which therefore show limited variation, actual salaries do not reflect personal valuations. We therefore use contingent valuation to assess respondent's willingness to work in rural areas [11]. Its use in the field of human resources for health is rare, and we know of only two examples: a study in Indonesia, which found that doctors under certain circumstances can be attracted to more remote areas using relatively small cash incentives, and the Ethiopia study discussed elsewhere in this paper [5],[12].

The contingent valuation method is used to elicit the valuation of goods or services for which there is no market. An example is the protection of a national park, where the value of preserving the park is elicited through contingent valuation questions for different groups of people to inform a cost-benefit analysis of policies to protect it. Thus, contingent valuation provides a method for gauging the otherwise unobserved demand curve. In this paper we use contingent valuation questions because the individuals in our sample have not yet entered the labor market, and there is therefore no observable wage. Furthermore, even after these students have entered the labour market, we only observe either the urban or the rural wage, not both and contingent valuation thus also provides a future counterfactual.

There has been controversy over how contingent valuations should be conducted [11],[13]. We followed best practice by administering the questionnaires in the schools, supervised by team members, to students whom have had practical work experience; by using actual starting wages for nurses and doctors as the reference wages; by offering a concrete choice between a post in Kigali and a post 100km from Kigali; and by using a payment card type question providing respondents with a range of well-defined offers [11].

We use a question similar to that used in Ethiopia, but adapted to Rwanda after careful piloting; it was phrased as follows:

“Imagine that when you finish your studies you are offered two jobs as a health worker in the public sector, one in Kigali and one in a rural area 100km from Kigali. Both contracts are for at least 3 years and the jobs are otherwise identical. Your monthly salary for the job in Kigali would be 215,000 Rwandese Francs. Which job would you choose if your monthly salary for the rural job would be \$ amount”

The question is repeated for seven different salary levels \$, starting at 165,000 RWF and gradually increasing up to 515,000 RWF for nursing students, and beginning at 310,000 RWF up to 710,000 RWF for medical students. For students with a reservation wage greater than the highest offer, an open-ended question was added to limit censoring from above.

Figure 1 plots the histograms of rural reservation wages (expressed in 2008 PPP US\$) and indicates that while the distribution for nurses tends to be bimodal, with one group of nurses having relatively low reservation wages and a second group distributed around a higher mean; the distribution for medical students is unimodal [14].

Figure 2 plots the cumulative distribution functions (CDF). The line to the left reflects the CDF for nurses and indicates that close to 40 percent of nursing students are willing to work in a rural area at the current starting wage (875 US\$ PPP), and that more nursing students are willing to work in a rural post as wage offers increase. A crude reading of the CDF suggests that to get 80 percent of new nurses to take up a rural post (under the strong assumption that wages are the sole determinant of location decisions) would require an average premium of 71 percent on top of the current starting wage. For medical students, only 7 percent are willing to work in a rural area for the current wage (1,430 US\$ PPP), and the concave shape of the CDF indicates that at higher wage levels, additional wage increases attract fewer extra doctors to rural areas. To get 80 percent of doctors taking up a rural post would require a wage premium of 57 percent. Qualitative research and the scarce existing quantitative research suggest that these differences in reservation wages are driven by a range of health worker characteristics, including motivation, rural background and household income [5],[12].

3. Estimation method

To analyze the contingent valuation data we estimate the following equation for the Rwanda sample:

$$RW_i = \beta_0 + \beta_1 HELPOOR_i + \beta_2 HHEXP_i + \beta_3 TSCORE_i + \beta_4 FEMALE_i + \beta_5 AGE_i + \beta_6 DISTANCE_i + \beta_7 KIGALI_i + \beta_8 RELIGIOUSAFFIL_i + \beta_9 DOCTOR_i + \beta_{10} STUDYYR_i + \beta_{11} OPENVAL_i + \varepsilon_i$$

The dependent variable RW is the natural log of the reservation wage at which a rural post is accepted. On the right-hand-side $HELPOOR$ is our measure for intrinsic motivation, and equals one if ‘opportunity to help the poor’ is ranked as the most important job characteristic by the respondent relative to other job attributes related to extrinsic motivation. The variable $HHEXP$ reflects the welfare of the parental household since most students do not have their own household yet. Having included questions on asset ownership identical to the ones used in the national Integrated Household Living Conditions Survey (IHLCS) conducted by the National Institute of Statistics of Rwanda, we can predict household expenditures [15]. The medical knowledge test score, $TSCORE$, allows us to test the presumption that students who perform better in school are less likely to work in rural areas. Further variables included on the right-hand-side are $FEMALE$ and AGE . We also include variables reflecting rural or urban background: $DISTANCE$, the time it took to walk to school at age six, and $KIGALI$, which equals one if the respondent was born in Kigali. In line with previous findings we expect health workers from rural areas to be more willing to work in a rural setting. A variable reflecting religious affiliation, $RELIGIOUSAFFIL$, is used to test whether this is associated with the provision of rural (and pro-poor) services as suggested by emerging research [12],[16].

We estimate the equation by ordinary least squares (OLS) to provide benchmark results. Because reservation wages are reported in ranges rather than exact values, we also use interval regressions, which take censoring of the reported reservation wages into account. Because of the relatively small number of observations, the next section focuses on the results for nursing and medical students together (while including a dummy, $DOCTOR$, for medical students); all the main results are similar for the sub-sample of nursing students only, and the results for doctors are largely the same but less pronounced due to the small sample size.

4. Results

Columns 1, 2 and 3 in Table 2 report the OLS results, and Columns 4, 5 and 6 the results from the interval regressions; both were run for the sample of 222 observations. The results are consistent across specifications and estimation methods, and indicate that

students with higher intrinsic motivation – those who rank ‘help the poor’ as the most important job characteristic – have lower rural reservation wages, with a coefficient statistically significant at the five percent level. Students who come from a richer background tend to have higher reservation wages, arguably because they can afford to be more selective about their work location, although the coefficient becomes insignificant in the second and third specifications (Columns 2, 3, 5, and 6), when proxies for rural background and being born in an urban area are included. We do not find any evidence that students with a higher score on the medical knowledge test are less willing to work in rural areas. However, students who grew up in more remote areas, measured by the distance to school at age six, have lower reservation wages, in line with findings from previous studies [17]. In our sample, the only statistically significant religious affiliation is Adventist, and the estimations therefore focus on this particular affiliation. The results in Columns 2 and 5 imply that students who are Adventist have lower rural reservation wages on average. Anecdotal evidence suggests that this reflects a local bonding scheme operated by Adventist communities in Rwanda, where a student has to repay funding either by working for the community, or in cash, and is encouraged to do her internship in a rural facility where she can later work. To unravel the effect of Adventist, we include an indicator variable for having rural work experience, *RURWEXP*, and an indicator variable reflecting whether the health worker has an obligation to pay back education expenses, *OBLIGATION*, and because not all Adventists necessarily participate in such a scheme, we include an interaction term between Adventist and these two variables, to reflect participation in the scheme. The inclusion of the interaction term renders the variable *ADVENTIST* insignificant (Columns 3 and 6), confirming that the latter reflected participation in the bonding scheme in the previous specification. While the local bonding scheme is known, it has so far only been documented with anecdotal evidence; our results suggest that it is effective in getting young health workers to take up rural posts. Finally, medical students have significantly higher reservation wages than nurses, as expected.

The advantage of using an identical instrument to that in the Ethiopia survey is that the results can be compared. To save space we do not reproduce the regression results for Ethiopia, but refer instead to the original publication which reports a significant positive association between intrinsic motivation and willingness to work in a rural area, as in the Rwanda case [12]. Students from a richer background have higher reservation wages, and those who grew up in more remote areas and Catholic students have lower reservation wages. The latter is explained by the fact that most catholic students attended an NGO school that strongly encouraged commitment to rural service in its education.

Because of the relatively low number of observations in each sample, we pool the observations for the two countries to estimate the coefficients more precisely. Table 3 shows the results for Ethiopia and Rwanda with Columns 1 and 2 presenting the OLS results, and Columns 3 and 4 the findings from the interval estimation. Intrinsic motivation remains highly significant, at the one percent level, and is associated with lower reservation wages. The Adventist variable is also highly significant, reflecting the local bonding scheme operated in Rwanda as set out above. Catholic is weakly significant and reflects the catholic NGO in Ethiopia discussed earlier. The variable Protestant is also significant in the pooled data, while it was not in the separate samples, and further analysis is needed to understand what this effect is capturing. Rural background, as measured by the distance variable is no longer significant, but the variable 'being born in Addis' is significant in Column 2, although not in Column 4. The reason is that the variables proxying for rural background are different in the two countries: distance to school in Rwanda and having an address in the capital in Ethiopia.

The main results are very robust despite the notable differences between the two countries. Rwanda is a small country with high population density and a mixed public-private health system, Ethiopia a vast country with low population density, which has made the transition to a combined public-private health system recently. This suggests that health workers' willingness to work in a rural area is not as context specific as is often assumed.

5. Discussion

The results presented in this paper provide clear evidence of substantial heterogeneity in health workers' willingness to work in a rural area. The analysis points to three factors in the Rwanda context: intrinsic motivation, rural background, and religious affiliation related to participation in a local bonding scheme. When supplementing the Rwanda data with similar data from Ethiopia, the results confirm two key determinants of rural reservation wages: motivation to help the poor and religious affiliation, where the latter reflects country specific activities by faith-based organizations: a local bonding scheme operated by the Adventist community in Rwanda, and training that encourages rural service by a Catholic NGO in Ethiopia. Among these results, the effect of motivation stands out as a particularly strong and robust finding.

What does this imply for policy making? A first message is that, while economic incentives undoubtedly play an important role, they are not the only factor. In line with a growing theoretical literature on public service delivery [18], our results corroborate empirically that health worker motivation is also an important factor. Targeting of

highly motivated health workers can therefore make schemes aimed at attracting and retaining staff in rural areas more effective. A simple simulation illustrates how it can also reduce costs. Assume for simplicity that we want 80 percent of nurses in rural areas because approximately 80 percent of the population lives here. Paying the rural premium of 71 percent for starting nurses to all nurses would require a budget increase of 30 percent of the HR budget or 1.2 percent of the total annual health budget. If instead highly motivated health workers were targeted to have 50 percent motivated workers, the budget would only need to increase with 22.5 percent of the HR budget or 0.9 percent of the total health budget. Although these are naïve simulations based on stringent assumptions, they illustrate the potential benefits of integrating motivation into human resource for health policies.

Second, health workers with certain observable characteristics such as rural background tend to be more willing to work in a rural area and should therefore be actively encouraged to choose a rural posting, for instance through targeted recruitment programs like the ones discussed above.

Third, the results on religious affiliation underline the important role of faith-based institutions in the health sector in Sub-Saharan Africa, and both the Rwanda and Ethiopia cases offer examples to inspire future policymaking.

Of these three factors that affect health workers' willingness to work in a rural area, rural background is the more tangible, while the role of intrinsic motivation, and the context specific role of faith-based institutions, deserve more attention in future analytical work.

Figures and tables

Figure 1. Histograms of rural reservation wages in Rwanda

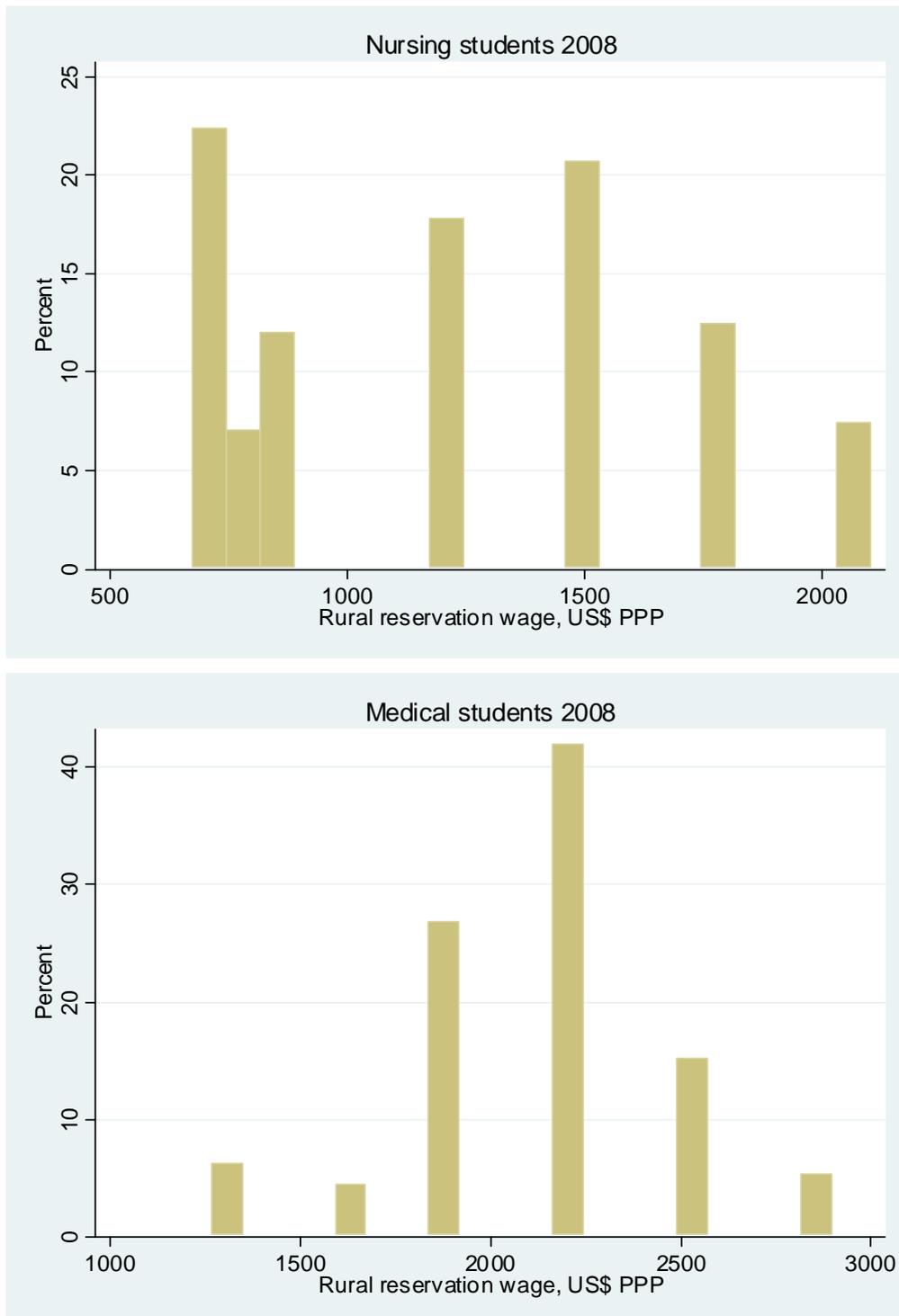


Figure 2. Cumulative distributions of rural reservation wages in Rwanda

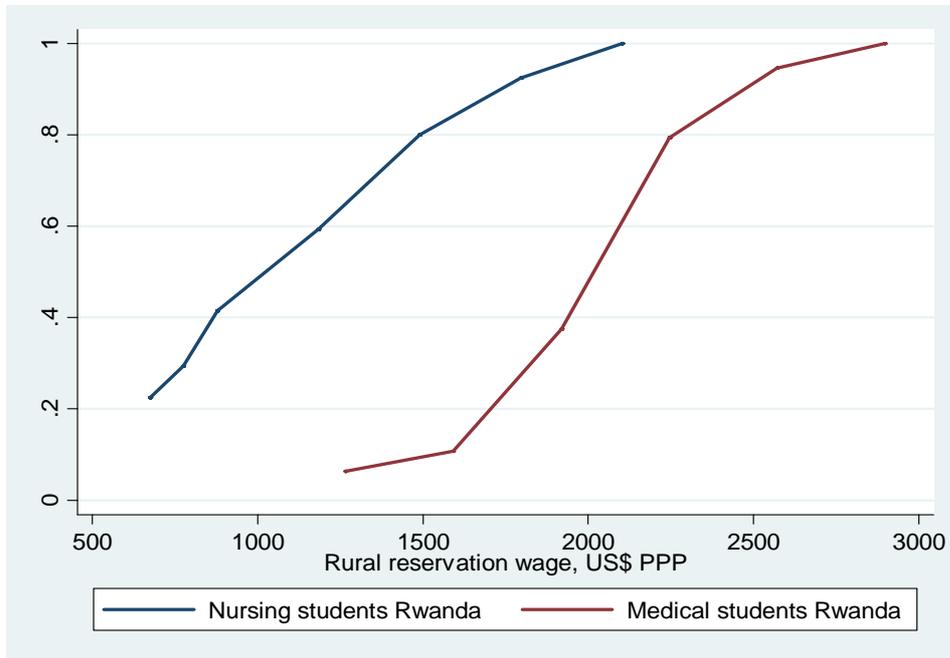


Table 1. Descriptive statistics

Variable	Description	Rwanda	Ethiopia
		Mean (std deviation)	
RW	Rural reservation wage (US\$ PPP)	1711 (786)	620 (279)
HELPPoor	Dummy variable indicating opportunity to help the poor is most important job characteristic	0.05 (0.23)	0.24 (0.43)
HHEXP	Predicted parental household expenditure (US\$ PPP)	14158 (14051)	4985 (1750)
TSCORE	Percentage score on medical knowledge test	0.33 (0.12)	0.49 (0.12)
FEMALE	Dummy variable indicating respondent is female	0.59 (0.49)	0.36 (0.48)
AGE	Age of respondent (years)	27 (5)	23 (3)
DISTANCE	Distance to school at age six (minutes)	36 (29)	30 (26)
ADVENTIST	Dummy variable indicating respondent is Adventist	0.11 (0.31)	
CATHOLIC	Dummy variable indicating respondent is Catholic		0.09 (0.28)
PROTESTANT	Dummy variable indicating respondent is Protestant		0.23 (0.42)
KIGALI	Dummy variable indicating respondent born in Kigali	0.25 (0.43)	
ADDIS	Dummy variable indicating respondent born in Addis		0.25 (0.44)
OBLIGATION	Dummy variable indicating respondent has obligation to either work or repay funding received	0.62 (0.49)	
RURWEXP	Dummy variable indicating respondent had rural work experience during training	0.42 (0.49)	
DOCTOR	Dummy variable indicating respondent is a medical student	0.31 (0.46)	0.31 (0.47)
Observations		222	270

Table 2. Ordinary least squares and interval estimation of rural reservation wages for Rwanda*†‡

	Nursing and medical students					
	OLS			Interval regressions		
	(1)	(2)	(3)	(4)	(5)	(6)
HELPPoor	-0.230** (0.104)	-0.236** (0.101)	-0.240** (0.106)	-0.302** (0.141)	-0.309** (0.139)	-0.306** (0.140)
HHEXP	0.042* (0.024)	0.020 (0.028)	0.023 (0.026)	0.049* (0.026)	0.026 (0.031)	0.027 (0.029)
TSCORE	0.003 (0.002)	0.003 (0.002)	0.003 (0.002)	0.003 (0.003)	0.003 (0.002)	0.003 (0.003)
AGE	0.007 (0.004)	0.006 (0.004)	0.010** (0.004)	0.007 (0.005)	0.006 (0.005)	0.010** (0.005)
FEMALE	0.001 (0.050)	-0.036 (0.047)	-0.050 (0.046)	-0.011 (0.057)	-0.055 (0.053)	-0.072 (0.052)
DISTANCE		-0.001* (0.001)	-0.002** (0.001)		-0.002** (0.001)	-0.002** (0.001)
KIGALI		0.027 (0.051)	0.027 (0.049)		0.000 (0.055)	0.004 (0.053)
ADVENTIST		-0.228*** (0.074)	-0.094 (0.088)		-0.323*** (0.091)	-0.135 (0.103)
RURWEXP			-0.132*** (0.046)			-0.150*** (0.051)
OBLIGATION			0.058 (0.045)			0.073 (0.049)
ADV*RURWEXP*OBLIG			-0.268** (0.109)			-0.403** (0.161)
DOCTOR	0.281** (0.120)	0.278** (0.113)	0.211* (0.118)	0.310** (0.145)	0.310** (0.134)	0.242* (0.138)
R-squared	0.586	0.615	0.645			

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

*The dependent variable is the natural log of the reported reservation wage.

†All regressions include a constant term and controls for year of study and for respondents with reservation wages greatest than the highest offer.

‡ADV*RURWEXP*OBLIG indicates that a respondent has rural work experience, an obligation to work or repay funding received, and is Adventist.

Table 3. Ordinary least squares and interval estimation of rural reservation wages for Ethiopia and Rwanda*†

	Nursing and medical students			
	OLS		Interval regressions	
	(1)	(2)	(3)	(4)
HELPPPOOR	-0.153*** (0.042)	-0.179*** (0.043)	-0.230*** (0.065)	-0.236*** (0.067)
HHEXP	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
TSCORE	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.003)	-0.001 (0.003)
FEMALE	0.047 (0.033)	0.007 (0.035)	-0.017 (0.047)	-0.038 (0.049)
AGE	0.000 (0.004)	-0.000 (0.004)	-0.003 (0.005)	-0.003 (0.005)
DISTANCE		-0.001 (0.001)		-0.001 (0.001)
KIGALI		-0.012 (0.067)		-0.022 (0.082)
ADDIS		0.086** (0.041)		-0.044 (0.070)
ADVENTIST		-0.291*** (0.100)		-0.395*** (0.129)
CATHOLIC		-0.074 (0.050)		-0.115* (0.070)
PROTESTANT		-0.074* (0.040)		-0.123** (0.054)
DOCTOR	0.694*** (0.029)	0.640*** (0.033)	0.710*** (0.041)	0.662*** (0.045)
R-squared	0.762	0.768		

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

*The dependent variable is the natural log of the reported reservation wage.

†All regressions include a constant term and a dummy variable for Ethiopia.

References

1. Hays, RB, Veitch, PC, Cheers, B, and Crossland, L. Why doctors leave rural practice. *Australian Journal of Rural Health* 1997; 5: 198-203; Kamien, M. Staying in or leaving rural practice: 1996 outcomes or rural doctors' 1986 intentions. *Medical Journal of Australia* 1998; 169: 318-321; Peters, DH, Yazbeck, A, Sharma, R, Ramana, GNV Pritchett, L, and Wagstaff, A. *Better health systems for India's poor: findings, analysis and options*. Washington, DC: World Bank; 2002; and Shields, MA. Addressing nurse shortages: what can policymakers learn from the econometric evidence on nurse labour supply? *Economic Journal* 2004; 114: F464-498.
2. Wibulpolprasert, S, Pengpaibon, P. Integrated strategies to tackle the inequitable distribution of doctors in Thailand: four decades of the experience. *Human Resources for Health* 2003; 1:12 and Sempowski, I. Effectiveness of financial incentives in exchange for rural and underserved area return-of-service commitments: systematic review of the literature. *Canadian Journal of Rural Medicine* 2004; 9: 82-88.
3. Anderson, M, Rosenberg, MW. Ontario's underserved area program revisited: an indirect analysis. *Social Science and Medicine* 1990; 35-44 and Nigenda, G. The regional distribution of doctors in Mexico, 1930-1990: a policy assessment. *Health Policy* 1997; 39: 107-122.
4. Rabinowitz, HK, Diamond, JJ, Markham, FW, Hazelwood, CE. A program to increase the number of family physicians in rural and underserved areas: impact after 22 years. *Journal of the American Medical Association* 1999; 281: 255-260; Easterbrook, M, Godwin, M, Wilson, R, Hodgetts, G, Brown, G, Pong, R, Najgebauer, E. Rural background and clinical rural rotations during medical training: effect on practice location. *Cmaj*. 1999; 160(8): 1159-1163; Rolfe, IE, Pearson, SA, O'Connell, DL; Dickinson, JA. Finding solutions to the rural doctor shortage: the roles of selection versus undergraduate medical education at Newcastle. *Aust N Z J Med*. 1995; 25(5): 512-517; Wibulpolprasert, S, Pengpaibon, P. Integrated strategies to tackle the inequitable distribution of doctors in Thailand: four decades of the experience. *Human Resources for Health* 2003; 1:12 and Sempowski, I. Effectiveness of financial incentives in exchange for rural and underserved area return-of-service commitments: systematic review of the literature. *Canadian Journal of Rural Medicine* 2004; 9: 82-88; and Chomitz, KM, Setiadi, G, Azwar, A, Ismail, N, Widiyarti. What do doctors want? Developing incentives for doctors to serve in Indonesia's rural and remote areas. World Bank Policy Research Working Paper No. 1888. 1998.

5. Chomitz, KM, Setiadi, G, Azwar, A, Ismail, N, Widiyarti. What do doctors want? Developing incentives for doctors to serve in Indonesia's rural and remote areas. World Bank Policy Research Working Paper No. 1888. 1998; Kristiansen, IS, Forde, OH. Medical specialists' choice of location: the role of geographical attachment in Norway. *Soc Sci Med* 1002; 34(1): 57-62; Laven, G, Wilkinson, D. Rural doctors and rural backgrounds: how strong is the evidence? A systematic review. *Aust J Rural Health* 2003; 11(6): 277-284; Lievens, T, Serneels, P, Butera, JD. Where, why and for how much. Diversity in career preferences of future health workers in Rwanda. Draft 2008; and Lindelöw. M, Serneels, P. The performance of health workers in Ethiopia: results from qualitative research. *Soc Sci Med* 2006; 62: 2225-2235.
6. Besley, T, Ghatak, M. Competition and incentives with motivated agents, *American Economic Review* 2005, 95(3): 616–636; Dixit, A. Incentives and organizations in the public sector: an interpretative review. *Journal of Human Resources* 2001, 37: 696–727; Franco, L.M, Bennett, S, Kanfer, R. Health sector reform and public sector health worker motivation: a conceptual framework. *Soc Sci Med* 2002, 54: 1255–1266; Francois, P, Vlassopoulos, M. Pro-social motivation and the delivery of social services. *CESifo Economic Studies* 2008; Prendergast, C. Intrinsic motivation and incentives. *American Economic Review* 2008, 98(2): 201–205; Lindelöw. M, Serneels, P. The performance of health workers in Ethiopia: results from qualitative research. *Soc Sci Med* 2006; 62: 2225-2235.
7. WHO. *World health report 2006. Statistical annex*. Geneva: World Health Organisation. 2006.
8. Ministry of Health Rwanda. *Rwanda Health Sector Policy*. 2005. http://www.moh.gov.rw/index.php?option=com_content&view=article&id=53&Itemid=28
9. WHO global health atlas. 2009. <http://apps.who.int/globalatlas/DataQuery/default.asp>
10. World Bank. *World Development Indicators*. Washington, DC: World Bank. 2009.
11. Portney, PR. The contingent valuation debate: why economists should care. *Journal of Economic Perspectives* 1994; 8:3-1.
12. Serneels, P, Lindelöw, M, Montalvo, JG, and Barr, A. For public service or money: understanding geographical imbalances in the health workforce. *Health Policy and Planning* 2007; 22(2): 128-138.

13. Diamond, P, Hausman, J. Contingent valuation: is some numbers better than no numbers? *Journal of Economic Perspectives* 1994; 8(4): 45-64; Hanemann, M. Valuing the environment through contingent valuation. *Journal of Economic Perspectives* 1994; 8(4): 19-43.
14. International Monetary Fund. World Economic Outlook Database. October 2008.
15. Grosh, M, Baker, J. Proxy means test for targeting social programs: simulations and speculation. LSMS Working Paper 118, 1995; Ahmed A, Bouis H. 2001. Identifying the needy: proxy means tests for targeting food subsidies in Egypt. Washington, DC: The International Food Policy Research Institute. The Rwanda data obtained from the UNICEF *Rwanda Integrated Child Poverty and Budget Study 2009* courtesy of Emily Wylde.
16. Reinikka, R. and Svensson, J. Working for God? Evaluating service delivery of religious not-for-profit health care providers in Uganda. World Bank Policy Research Working Paper No. 3058. 2003.
17. Dunbabin J, Levitt L. Rural origin and rural medical exposure: their impact on the rural and remote medical workforce in Australia. *Rural and Remote Health* 2003; 3; de Vries E, Reid S: Do South African medical students of rural origin return to rural practice? *S Afr Med J* 2003; 93(10):789-793; Serneels, P, Lindelöw, M, Montalvo, JG, and Barr, A. For public service or money: understanding geographical imbalances in the health workforce. *Health Policy and Planning* 2007; 22(2): 128-138; Chomitz, KM, Setiadi, G, Azwar, A, Ismail, N, Widiyarti. What do doctors want? Developing incentives for doctors to serve in Indonesia's rural and remote areas. World Bank Policy Research Working Paper No. 1888. 1998
18. Dixit, A. Power of incentives in private vs public organisations. *American Economic Review Papers and Proceedings* 1997; 87(2); Dixit, A. Incentives and Organizations in the Public Sector: An Interpretative Review. *The Journal of Human Resources* 2002; 37(4): 696-727; Wilson, JQ. *Bureaucracy: what government agencies do and why they do it*. New York: Basic Books; 1989; Francois, P, Vlassopoulos, M. Pro-social motivation and the delivery of social services. *CESifo Economic Studies* 2008.