Pro-social preferences and self-selection into jobs: Evidence from South African nurses

Journal of Economic Behavior & Organization 107 (2014) 136–152

Contents lists available at ScienceDirect

Journal of Economic Behavior & Organization

journal homepage: www.elsevier.com/locate/jebo

Pro-social preferences and self-selection into jobs: Evidence from South African nurses

Mylene Lagarde[a,*], Duane Blaauw[b]

[a] Department of Global Health and Development, London School of Hygiene and Tropical Medicine, 15-17 Tavistock Place, London WC1H 9SH, UK
[b] Centre for Health Policy, University of Witwatersrand, 1 Jan Smuts Avenue, Braamfontein, Johannesburg 2000, South Africa

ARTICLE INFO

Article history:
Received 19 December 2013
Received in revised form 3 September 2014
Accepted 7 September 2014
Available online 16 September 2014

JEL classification:
C99
D64
J44
J61

Keywords:
Public services
Pro-social motives
Self-selection
Rural areas
Nurses
South Africa

ABSTRACT

Although a growing body of economic work has looked at the role of pro-social motives to explain self-selection into public or not-for-profit sector jobs, in particular in the delivery of social services, no attention has been given to the role of pro-social preferences in the decision to take up posts in rural and isolated areas. Yet there are reasons to believe that such choices involve a degree of self-sacrifice, in particular in developing countries where rural regions typically combine geographic hostile environment, high levels of poverty, low educational opportunities, limited access to basic services and worse career opportunities. On the other hand, as shortage of qualified staff is higher in rural areas, the returns on the presence of a health worker, and the benefits to the populations, are likely to be higher. Using data from a longitudinal study of nurses in South Africa this paper tests this hypothesis by linking experimental measure of pro-social preferences and revealed preferences outcomes. Three measures of pro-social preferences are constructed based on donations made by study participants in a dictator game played at baseline. Job choices are observed three years later for more than 97% of the initial sample. We show that the more dedicated the nurses – measured by their generosity towards patients in the dictator game – the more likely they are to have chosen a rural job. This result is robust to the inclusion of various demographic controls and to different econometric specifications. This finding contributes to the literature on role of pro-social values as an intrinsic motivation factor in labour supply decisions and it has policy implications for the provision of social services in difficult settings.

1. Introduction

Moving away from the traditional emphasis on purely selfish motives, a growing body of work has investigated the role played by pro-social preferences on individual decisions (see Meier, 2006 for a review). In relation to labour supply decisions, some attention has been paid to the role of pro-social preferences to explain the self-selection of individuals into the public sector or into not-for-profit organisations, in particular in the delivery of social services (Besley and Ghatak, 2005; Delfgaauw, 2007; Francois and Vlassopoulos, 2008; Kolstad and Lindkvist, 2012; Serra et al., 2010). However, no attention has been given to the role of pro-social preferences in the decision to take up particular positions associated with low material welfare for

* Corresponding author. Tel.: +44 207 927 2090; fax: +44 207 927 2701.
E-mail address: Mylene.Lagarde@lshtm.ac.uk (M. Lagarde).

http://dx.doi.org/10.1016/j.jebo.2014.09.004

the worker and high benefits for others, benefiting from the worker's presence. Yet if workers care about the benefits they bring to social service beneficiaries (e.g. patients, pupils), they might be willing to trade off some of their own welfare against the additional welfare recipients derive from having access to public services.

Rural jobs of social sector in low- and middle-income countries typically fit this definition. Rural communities typically face challenging social and economic environment often exacerbated by isolation, extreme weather conditions, lack of public transport, difficulty of access to and limited choice of goods and services. Empirical evidence suggests that public goods, such as roads or health facilities, can generate welfare gains in rural areas (Jalan and Ravallion, 2002). Even when infrastructure such as hospitals, roads or schools are available, access to public services remains poor in rural areas as governments typically struggle to recruit and retain qualified staff in such posts (Dussault and Franceschini, 2007; Mulkeen and Chen, 2008). There are many reasons why teachers, nurses or doctors are reluctant to be deployed in rural areas. Living in a rural isolated area compared to an urban one is associated with reductions in objective as well as subjective welfare (Fafchamps and Shilpi, 2009). Working conditions can also be harder in rural areas due to professional isolation, and professional advancement more limited as access to training and networking opportunities is more restricted (Hedges, 2002).

Governments have used various strategies to encourage public servants to take up rural jobs. In health for example, many countries have imposed mandatory services in rural settings in exchange for subsidising nursing or medical studies (Frehywot et al., 2010). More frequently, financial incentives in the form of bonus payments, subsidised housing or hardship allowances have been used (Mulkeen and Chen, 2008; Sempowski, 2004). Recognising instead that there might be some heterogeneity in the opportunity cost of working in rural areas (Hammer and Jack, 2002), some governments have sought to train as professionals individuals who are more likely to accept rural jobs at a later stage, for example by offering scholarships to increase the recruitment of graduates originating from rural areas (Grobler et al., 2009; Ross and Couper, 2004).

This paper tests whether pro-social preferences predict the choice of more altruistic positions. Using data from a panel of South African nurses, we are able to test whether generous behaviours observed in framed dictator games (DG) played at baseline, are associated with the choice of rural jobs, where health workers are able to help more needy people at the expense of their own personal welfare. Using decisions made by nurses played during the baseline survey, we construct three distinct measures of pro-social preferences: a generic measure of altruism (donation to a peer); a measure of pro-poor attitude (donation to a poor person) and a measure of nurses' professional dedication (donation to a patient). We show that a higher dedication to patients is associated with an increased probability of taking up a job in a rural remote area. This result is robust to the inclusion of key socio-demographic variables generally associated with preferences for rural jobs, to different constructions of the dependent variable and dedication measure, and to various econometric specifications. On the other hand, we find weak evidence that a pro-poor attitude in the DG is associated with rural job choices, and no evidence of the effect of generosity towards one's peer. We find these results consistent with the idea that dedication measures social service providers' willingness to sacrifice their well-being to increase the marginal benefits of service beneficiaries.

This paper is organised as follows. Section 2 presents the related literature, and Section 3 describes the South African context and Section 4 the data used in the paper and the empirical strategy used. Section 5 reports the results and Section 6 presents different robustness checks. Section 7 briefly discusses the results and their implications.

2. Related literature

2.1. This paper is related to four different strands of the literature

First, this study contributes to the literature on the role of pro-social motives in the labour market, in particular with regard to sorting of individuals into particular types of jobs. Besley and Ghatak (2005) first proposed that matching employers and employees with similar missions or objectives can reduce the need for extrinsic incentives. Bénabou and Tirole (2006) and Delfgaauw and Dur (2008) further argue that due to the utility they derive from their contribution to the provision of public goods, altruistic or pro-socially motivated individuals are less sensitive to extrinsic incentives than self-interested ones, and hence self-select into less lucrative but pro-socially oriented public sector jobs. More closely related to the argument made in this paper, Delfgaauw (2007) shows that "dedicated" doctors[1] tend to self-select into the jobs (public sector ones) for which the marginal benefit they provide to patients is greater. In their model, this conclusion derives from the hypothesis that public sector patients are poorer than private sector ones, so that the utility of seeing a doctor for free in the public sector is greater than seeing the same doctor in the private sector. In this study, we add to this literature by proposing that pro-social motives can act as a sorting mechanism in the choice of jobs located in challenging areas characterised by poor amenities, if the pro-social preferences of service providers is specifically targeted at service beneficiaries – that is if they care about the marginal benefits their action will provide to service recipient. We argue that in a context where there is a lack of public service providers in rural areas, the marginal benefit derived by rural populations from the presence of a provider is greater than that of urban populations. Therefore "dedicated" workers are more likely to choose rural posts.

[1] Defined as those doctors who have in their utility function a patient's marginal benefit derived from the care they provide.

Few empirical studies have tested the relationship between pro-social motives and job choices, partly due to the difficulty to find suitable measures of pro-social preferences. A large number of empirical studies comes from the field of political science (public administration) and psychology, and show a positive association between self-reported survey measures of pro-social behaviours and choosing public jobs (Perry and Wise, 1990). A couple of economic studies have used work-related behaviours as indicators of pro-social behaviours: Rotolo and Wilson (2006) show that public sector employees tend to undertake more volunteer work, while Gregg et al. (2011) find that public servants do more unpaid overtime work. Recently, efforts have been made to improve the measures of pro-social motives by using decisions made in experimental economic games and triggered by actual financial incentives (Camerer and Fehr, 2002). Two studies closely related to this paper have sought to test empirically whether health care providers displaying more pro-social motivations in economic experiments are likely to be more attracted to public (Kolstad and Lindkvist, 2012) or not-for-profit (Serra et al., 2010) jobs. In a study of actual job choices made by doctors and nurses in Ethiopia, Serra et al. (2010) test the predictions of Besley and Ghatak (2005) that workers with more pro-social orientations will seek like-minded employers, which are identified as not-for-profit employers (NGO) in their context. Using panel data, they link actual job choices to proxies of pro-sociality measured at baseline by the amount of money returned in a trust game. They show that greater pro-social motivation is associated with a higher probability of working for an NGO. However, their result is not robust to the inclusion of a dummy controlling for the fact that some health workers were trained in NGO institutions. This raises questions about the potential endogeneity of pro-social attitudes, which might in fact be linked to a nurturing process during training. Seeking to test the predictions of Delfgaauw (2007) in Tanzania, Kolstad and Lindkvist (2012) find that nursing and medical students who report an intention to work in the public sector when they graduate also display more altruistic decisions in two economic games (a dictator game and in a trust game). However, their results may not have been robust to a more comprehensive multivariate analysis[2] and only rely on stated preference for public jobs (not actual choices). Our study adds to this body of work by using three different measures of pro-social motives obtained in framed dictator games, and linking them to job choices observed in follow-up surveys. The diversity of pro-social preferences measured allows us to refine the analysis made by previous papers, by showing that what explains job choices best is primarily nurses' willingness to dedicate themselves to patients.

Another body of work relevant to this paper is the health literature looking at the factors associated with the choice of rural jobs by health care providers (see for example the reviews of Laven and Wilkinson, 2003; Lehmann et al., 2008 or Wilson et al., 2009). This evidence suggests that having a rural upbringing and having been exposed to rural areas through training increases the likelihood of being in a rural post. Other factors such as gender, ethnicity, family constraints have sometimes been found to be relevant. However, this evidence based on cross-sectional studies potentially suffers from selection bias. Finally, we are aware of only one study that sought to examine the association between pro-social motives and rural job choices (Serneels et al., 2007). Serneels et al. (2007) find that nursing and medical students in Ethiopia who say that helping the poor is the most important job attribute state that they would accept a lower reservation wage to work in a rural area. Our study takes this previous study further by using more robust outcome variables (actual rural job choices) and measures of pro-social motives (derived from economic games).

Finally, this paper adds to the limited literature testing one aspect of the external validity of experimental measures, by testing whether measures of social preferences obtained in the lab predict actual behaviours of the same individuals obtained in real settings. Although limited, this literature finds strong positive correlations between other-regarding preferences in the lab and other-regarding preferences in real life (Cooper and Kagel, 2013). For example Karlan (2005) showed that behaviour in trust games predicted repayment of loans to a Peruvian group lending micro-finance programme. In another example, Carpenter and Seki (2011) show that pro-social behaviour of fishermen crew in a public good game (measured as conditional cooperation and disapproval of shirking) relates to higher productivity in fishing, which by its very nature involves cooperation between workers on a given boat.

3. Institutional setting

3.1. Rural and urban areas in South Africa

In developing countries, rural and isolated regions are sometimes referred to as "poverty traps" (Jalan and Ravallion, 2002), as they display a combination of geographic hostile environment, high levels of poverty, low educational achievements, worse health conditions, and limited access to basic services (Kanbur and Venables, 2005). This is not untrue in South Africa where rural areas[3] are plagued by multiple challenges, some of which are a lingering legacy of the formal policies of spatial separation enforced under the Apartheid regime.

[2] Descriptive statistics of the small sample used ($N = 67$) show that women are also more likely to choose public jobs, which may be a confounder of altruistic motives.

[3] In South Africa there is no standardised definition or criteria of what a "rural area" is. There have been some attempts to develop definitions, including the use of population densities, sizes of towns, characteristics of the infrastructure or predominance of agriculture. In its report on urbanisation and migration, Statistics South Africa defined 'rural' on the basis of a number of indicators available in Census data, including whether an area fell under a traditional authority, whether it was located outside of the metros and whether it lacked 'urban characteristics' such as availability of amenities and infrastructure. It estimated that 43.7% of South Africa's population was rural. As a result of this lack of consensus, it was decided to ask participants to qualify the environment where they work in terms of rurality.

Rural South Africa includes a majority of household with low level of education, limited income and with limited access to arable and grazing land, creating food insecurity (Statistics South Africa, 2008). In addition, although since 1994 many efforts have been made to improve access to public sector services in previously under-funded and systematically disadvantaged 'homeland' areas, access to affordable, good quality services is limited in rural South Africa. Data from the recent census shows that there is a higher proportion of households with no access to clean water and toilet facilities in rural areas (Statistics South Africa, 2012). Similarly, residents of North West and Limpopo, two of the most rural provinces, have the lowest access to health professionals of different categories, while the residents of the urban provinces of Gauteng and Western Cape have the best access (Day and Gray, 2010). Due to geographic barriers, cost of access to services is higher in rural areas, with opportunity costs adding to the cost of scarce transport to cover large distances. For example, 15% of poor rural households still live more than an hour away from the closest clinic and 20% live more than an hour away from the closest hospital (Gaede and Versteeg, 2011). Partly as a result of these poor economic and social conditions, health outcomes in rural areas tend to be worse than in urban ones. In 2007, infant mortality rates were found to be 71.2 per 1000 live births in rural areas compared with 43.2 per 1000 live births in urban areas (Bradshaw, 2008). Comparing urban and rural provinces, the maternal mortality ratio is three times worse in rural Free State than it is in Gauteng (the best performing, urban, province), and a person with tuberculosis (TB) in Gauteng has a 19.9% higher chance of being cured than a person with TB in the North-West, a rural province (Gaede and Versteeg, 2011). Internal migration is another factor driving poor health, as the healthier economically active populations migrate to the urban economic centres to work, but return to their rural homes if they fall ill to be cared for by their family (Clark et al., 2007).

However, deprivation and extreme poverty also exist in urban South Africa. In fact, with the end of discriminatory controls on access to the cities, urban poverty has grown since 1994, with an increasing proportion of the poor relocating to urban areas (Leibbrandt et al., 2010). Therefore urban centres include large pockets of extreme poverty, with people living in dire conditions in informal settlements in the formerly segregated townships (Leibbrandt et al., 2010). Yet, access to amenities and public services remains generally much better in urban areas (Statistics South Africa, 2012), as distance does not act as a barrier and provision of public goods is generally fine.

3.2. The nursing labour market

At the end of the Apartheid era, the South African health system was characterised by inequalities in coverage and quality of services, where white population groups were benefiting from good quality services in urban centres, whilst certain geographic areas (in particular rural 'homeland' areas) were systematically under-funded (Coovadia et al., 2009; Ntsaluba and Pillay, 1998). Despite major reforms and investments to improve public sector health care services and increase access to basic health care for all, South Africa still displays a fragmented system. Today, the private sector is almost exclusively located in urban areas and serves the wealthier 15% of the population covered by private health insurance, and some 20% who sometimes seek primary care out-of-pocket. Therefore the public sector serves the majority and poorer part of the population (McIntyre et al., 2007), and virtually acts as a unique provider of health care in rural areas.

A combination of several factors contributes to make public posts less attractive than private ones. Chronic understaffing, high workload, low recognition from management and sometimes violence in the workplace has led to low morale and sometimes burnout (Ehlers, 2003; Erasmus, 1998; Erasmus and Brevis, 2005; Penn-Kekana et al., 2005; Shisana et al., 2003). These challenging conditions in public posts tend to be worse in rural settings where under-staffing is more acute than in urban settings, as the government is struggling more to recruit and retain qualified staff and fill vacant positions (SANC, 2008). In rural areas, small teams of health professionals are also more vulnerable to staff turnover, with the loss of one professional having a large impact on service delivery and the workload of staff remaining in place (Reid et al., 1999). The inadequate staffing levels compounds the challenges of poor quality of equipment and infrastructure, as the quality of public health infrastructure sometimes reflects the level of deprivation of rural areas. For example, a study on primary care facilities in four rural districts found that only 22.5% of facilities had access to safe drinking water, 65% had electricity, 57.5% had flush toilets and 12.5% had operational telephone (Schoeman et al., 2010). With regards to working conditions, there is evidence of greater lack of resources, insufficient equipment or poorly maintained buildings which are also reasons why nurses leave their posts in rural areas (Hall, 2004; Mokoka, 2007). A recent study also showed that nurses in rural South Africa are dissatisfied with pay and work conditions, the latter including staffing levels, availability of equipment and work space (Delobelle et al., 2011).

Ill-conceived closures of nursing training institutions coupled with ageing and emigration of the nursing population have led to a shortage of nurses in the short-run in the South African labour market, estimated between 14,000 and 21,000 Professional Nurses (Wildschut and Mqolozana, 2008). As shown in Fig. 1, the lack of professional nurses (and medical doctors) is widespread in the public health care system with numerous vacancies in all provinces of the country, both rural and urban. Several government initiatives have sought to attract and retain public sector nurses. In 2004, the Department of Health introduced significant financial incentives in the form of a Rural Allowance, giving a 8% salary increase to nurses in rural posts. In 2008, to make public jobs as competitive as private ones, the government introduced a general salary increase for public servants which resulted in an increase of nurses' salary by 24% (Department for Public Service and Administration, 2008). Finally, mandatory community service for nurses was introduced in 2008, requiring

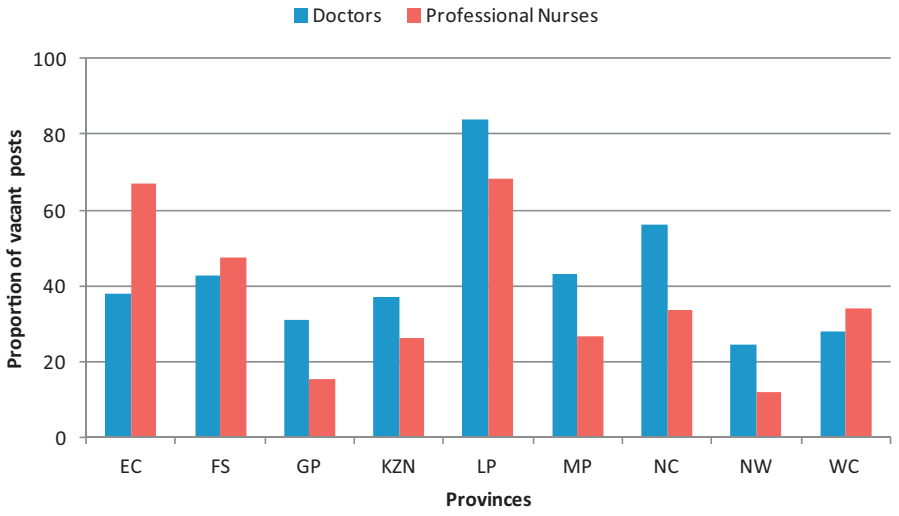

Fig. 1. Vacancy rates for nurses and doctors in the public sector, by province. *Note*: EC: Eastern Cape, FS: Free State, GP: Gauteng, KZN: KwaZulu-Natal, LP: Limpopo, MP: Mpumalanga, NC: Northern Cape, NW: North West, WC: Western Cap.
Source: Health System Trust based on figures from the Personnel Administration System.

all nursing students who graduate to serve in a public facility for a year before they are officially registered as Professional nurses.[4]

A similar unmet demand for nurses exists in the private sector even though it already employs 40% of nurses (Breier et al., 2009). Due to their difficulties to recruit nurses in the local market, private hospital groups have launched several initiatives to recruit foreign professional nurses (e.g. from India) for multiple-year contracts (Wildschut and Mqolozana, 2008).

Professional nurses are exclusively trained by public nursing colleges or universities, and nursing studies are largely subsidised by the government. After they have successfully completed their four years of training, graduating nurses have to complete a one-year community service before they are officially registered with the Nursing Council.[5] In addition, those who have received bursaries for their studies from local provinces are required to remain in post in these provinces an additional amount of time (varying between 1 and 1.5 year). As a result of the high demand for nurses in all areas in the countries (both in the public and private sector), once they have completed their public service requirements, Professional nurses are virtually free to choose where they want to work. Posts are opened and advertised by provinces (for public posts) and private sector providers, and nurses can apply anywhere.

4. Data

4.1. Nurse panel survey

We use data from a longitudinal study of nurses from South Africa. The baseline survey was conducted between August and October 2008 with final-year nursing students who were about to graduate and enter the labour market. The sampling strategy aimed at selecting nursing students who would differ in their potential exposure to rural jobs and rural life. First, two provinces were selected, a rural one (the North-West province) and an urban one (Gauteng province).[6] In each province, three nursing colleges and one university[7] were selected, and all final-year nursing students ($n = 578$) were invited to take part in the study. A total of 377 agreed to participate.[8]

All nurses who took part in the original baseline survey were followed up over time by telephone. To limit the risks of attrition, nurses were initially contacted every three to six months, with annual contacts in the last two years. During

[4] In addition, some nurses who have obtained bursaries to support them during their nursing studies have to remain in the public sector until the end of a pre-agreed contract (typically an additional 6 months to a year on top of their community service). These bursaries may apply to both rural and urban jobs.

[5] This registration is necessary to apply to any job as a Professional Nurse in South Africa.

[6] In Gauteng, only 4% of the population lives in rural areas, while 59% does in the North-West province (Kok and Collinson, 2006).

[7] While most nurses are usually training in nursing colleges, universities also have nursing degrees, although they are smaller programmes, and their content is sometimes more academic and less oriented towards clinical practice.

[8] This 65.2% response rate goes up to 76.7% if one excludes the first nursing college where data collection was organised on the same day as the end-of-year student party (which meant that only 37 students out of the 135 final years participated in the study).

Table 1
Employment destination of nurses at follow-up.

	Urban	Rural	Total	%
Nursing jobs	244	109	343	93.2%
Public sector, SA	193	106	299	
Private sector, SA	36	3	39	
Overseas	5	0	5	
Other jobs	15	5	20	5.4%
Finishing community service[a]		1	1	
Nurse jobs in a prison[b]	1	2	3	
Occupational nursing in private companies	4		4	
Non-nursing jobs[c]	10	2	12	
Not working	5		5	1.4%
Studying	3		3	
Unemployed	2		2	
Total	254	114	368	100%

[a] One nurse took several years to pass her exams and, as a result, her career path was delayed.
[b] We excluded these individuals from the analysis sample, on the ground that this is a restricted nursing job, in which nurses will not be able to provide health care to a large population. Our results are robust to the inclusion of these three individuals.
[c] That includes jobs in laboratory services ($n=6$), administrative jobs in private-not-for-profit companies ($n=2$), research jobs ($n=2$), administrative positions for private health insurance companies ($n=1$), in a pharmacy ($n=1$).

Table 2
Locations of nurses' jobs.

	Deep rural	Rural village	Small town in a rural area	Small town in an urbanised area	Large town	City	Total
Public sector	17	37	51	67	40	87	39
Based in health centres/clinic	14	34	30	41	18	19	
Based in hospitals	3	3	21	26	22	68	
Private sector		1	2	6	10	20	299
Based in health centres/clinic	0	1	0	1	3	2	
Based in hospitals	0	0	2	5	7	18	
Overseas						5	5
Based in hospitals						5	5
Total	17	38	53	73	50	112	343
%	5.0%	11.1%	15.5%	21.3%	14.6%	32.7%	100%

these telephone interviews, very brief questionnaires were administered, mainly to ask about their occupational status. By November 2011 we had information on the occupational status of 97.3% ($n=368$) of the original sample.[9]

4.2. Job and location choices

Table 1 shows the work status of the 368 nurses who could be traced up three years after the baseline survey. While the majority (81.3%, $n=299$) still work as nurses in the public sector four years after their graduation, 1.4% ($n=5$) have left the country, 10.6% ($n=39$) work in the private sector, while a small number (5.4%, $n=20$) are either not working, or have taken up non 'traditional' nursing jobs.[10] We restrict the analysis of job choices to those individuals who still work as nurses,[11] so a total of 343 individuals.

In addition to their occupational status, we asked respondents to describe the area in which they were working. They were asked to choose one of the following categories: "deep rural village", "rural village", "small town in a rural area", "small town in an urbanised area", "large town" or "city". Table 2 below shows that only 31% of respondents work in a rural area as defined by the first three categories. The breakdown of posts by type of facilities shows that the majority of rural posts are in small health centres, although there are 29 nurses working in a hospital in a rural area.

Based on these data, two dependent variables are created. The first one is a dummy variable that takes the value 1 if the nurse reported that her job was located in one of the three rural categories. The second dependent variable takes the value 1 when the nurse works in a rural health centre. This second variable reflects the idea that jobs in rural health centres are more likely to cumulate two characteristics: health centres are often in areas more remote than hospitals and are less

[9] Since the baseline survey, five nurses had deceased; three had been lost to follow-up and one refused to continue to be part of the study.
[10] The model and analysis here focuses on the decisions made by nurses wanting to provide care to patients in health facilities. Therefore we have excluded from the analysis those individuals who have chosen less classic nursing jobs (e.g. occupational health in firms). The results remain the same if we include them.
[11] In addition to providing a more comparable population, this also limits the endogeneity problem that could arise from including individuals who chose occupations (e.g. laboratory jobs or research jobs) only available in urban areas.

staffed, meaning that holding a job there means that one is the primary point of contact for the surrounding population (whose alternatives are close to none).

4.3. Measures of pro-social preferences

To measure their pro-social preferences, nursing graduates were invited to take part in a double-blinded dictator game (DG) during the baseline survey. The DG is a simple behavioural economic game where participants are given an endowment to split between themselves and someone else (Forsythe et al., 1994). As decisions in a double-blinded DG are unconfounded by strategic or reputational concerns,[12] a strictly self-interested dictator should allocate nothing to the recipient. Therefore, the proportion of money given to the recipient is typically interpreted as a measure of pro-social preferences or altruism (Camerer, 2003; Camerer and Fehr, 2002).

Abandoning some degree of abstraction and framing the DG by providing specific information about recipients can be useful to elicit more specific other-regarding preferences (Aguiar et al., 2008; Brañas-Garza, 2006; Eckel and Grossman, 1996), in particular when seeking to understand the determinants of decision-making in a real-world context. In this study, nursing students interviewed at baseline played the role of the dictator and were asked to divide[13] R100 (approximately £6.6 at that time)[14] between themselves and a recipient in three DG where the recipient was framed differently. To avoid wealth effects, only one game was selected randomly at the end of the session to be paid. In one game, to measure nurses' dedication towards patients, recipients were identified as patients. To get a standard measure of altruism as traditionally defined in an anonymous DG, recipients were identified as another student in another DG. Finally to elicit a pro-poor attitude, recipients were defined as poor people in a third game.[15]

We expected the pro-social measures elicited through these three DGs to be more or less directly relevant to, and therefore correlated with, the career choices observed in the labour market. Specifically, we expected the proportion of money sent to patients to be a direct measure of the extent to which nurses are willing to sacrifice their own welfare for patients, which is the specific variation of pro-social preference we are interested in here. Generosity towards poor people is likely to capture some other aspect of pro-social preferences, which may not necessarily be relevant to the career choice of nurses. First, it is less directly relevant to nurses' jobs: a lot of poor individuals do not necessarily require health care, and not all patients treated (including in the public sector) are poor. Second, there are many ways of helping or being generous towards poor people for nurses, other than in their work, while this is less true for dedication towards patients. Finally, generosity towards one's peer, although it denotes some form of willingness to give to others, should be the least relevant to job choices outside the lab. Indeed, although instructions were extremely clear about the lack of reciprocity in the game and the anonymity of the donation, when recipients were identified as other nursing students dictators' generosity might have been driven by more self-serving motives through a process of identification with the recipient.[16] Hence we can expect that this decision in the lab is likely to be less relevant to career choices.

Overall, the three measures of pro-social attitudes provide a unique opportunity to test the link between real-world and experimental decisions, with an expectation that some experimental decisions are more relevant to real-world choices.

In keeping with good practice, the DGs were conducted according to a precise script that was developed prior to data collection,[17] and implemented, as far as was practically possible, by the same researcher in an attempt to limit any potential experimenter bias. Strict experimental procedures were established, forbidding communication between participants and ensuring that the choices made in the DG could not be seen either by fellow study participants or by the researchers present in the room.[18]

4.4. Econometric strategy

To test the role of pro-social preferences in the choice of rural jobs, we estimate the following equation with a Probit model:

$$\mathrm{RURAL}_i = \beta_0 + \beta_1 \mathrm{PROSOCIAL}_i + \beta_2 \mathrm{RUR\_BORN}_i + \beta_3 \mathrm{RUR\_STUDY}_i + \beta_4 \mathrm{SAL} + \beta_5 \mathrm{X}_i + \varepsilon_i$$

where RURAL_i is the binary outcome of interest for job choice, $\mathrm{PROSOCIAL}_i$ is the experimental measure of pro-social motives, $\mathrm{RUR\_BORN}_i$ is a dummy variable taking the value 1 if the individual was born in a rural area; $\mathrm{RUR\_STUDY}_i$ is a dummy variable

[12] Individual decisions remain unknown to the experimenter and recipients are not aware of the identity of their benefactor.

[13] They could split the money in eleven different ways (0% for the recipient, 10%, 20%, . . ., 100%).

[14] In keeping with the practices established by experimental economists in the field in developing countries, the stake of the game was determined by the daily wage of a beginning nurse.

[15] Payoffs to recipients were made at the end of the study. Students associations and charities were used to identify students, patients and poor people, and make the various donations.

[16] This explanation was clearly expressed by some participants in a few focus group discussions after the survey (e.g. "I thought about what I would want to receive if I was the recipient").

[17] Detailed instructions can be found here: http://www.wits.ac.za/files/9mcsh_259483001359383601.pdf.

[18] Researchers in charge of calculating the payoffs were in a separate room and payoffs were returned at the end of the data collection in a sealed envelope showing only participants' study numbers.

taking the value 1 if they studied in the rural (North-West) province; SAL is a variable controlling for the (log) monthly wage of the nurse in her job. X_i is a vector of demographic controls including age, gender, ethnic background, marital status, a dummy variable equal to 1 if the individual's first choice of study was related to health professions and finally survey-based variables capturing attitudes towards rural areas and job-related values. Finally ε_i is the usual idiosyncratic error term.

5. Results

5.1. Descriptive statistics

Table 3 provides a summary of the main variables of interest for the population analysed in this study. As expected in a nursing population, the proportion of male students is relatively low (13.4% in 2011 vs. 14.3% in 2008 for the baseline population). The majority of study participants are black/African (89.8% vs. 89.3%). The mean age was 31.3 years in 2008, and just fewer than 50% of participants said they were born in rural areas.

On average, nursing students decided to share 34.7% with a fellow student, 37.9% with a patient and 53.4% with a poor person. Fig. 2 shows the distribution of these three donations. The distributions of gifts made to patients and even more to students are right-skewed, denoting that many nurses have kept most of the money for themselves. By contrast, there are more generous behaviours (giving away 50% or more) when recipients are poor people. These differences are confirmed by Fig. 3 which reports the cumulative distribution functions of the three different games. This graph clearly shows the more generous decisions adopted by study participants when recipients were poor people.

Table 3
Descriptive statistics.

Variable name	Description	Obs	Mean	SD	Min	Max
Pro-social motives						
Donation to patient	% of endowment sent to patient in DG	343	0.38	0.21	0	1
Donation to poor	% of endowment sent to poor in DG	343	0.53	0.25	0	1
Donation to peer	% of endowment sent to nursing student in DG	343	0.35	0.20	0	1
Job characteristics						
Rural	Works in a rural area	343	0.32	0.47	0	1
Rural health centre	Works in a rural health center	343	0.23	0.42	0	1
Salary	Monthly salary (log) in Rands	337	9.17	0.26	7.31	10.09
Socio-demographic and education characteristics						
Male	Male	343	0.13	0.34	0	1
Black	Black	343	0.90	0.30	0	1
Born rural	Born in a rural area	343	0.48	0.50	0	1
Age	Age (in 2008)	343	31.27	7.73	21	56
Married	Married (in 2008)	343	0.31	0.46	0	1
At least 1 child	Has one child or more (in 2008)	343	0.63	0.48	0	1
Trained rural	Studied in rural (North-West) province	343	0.41	0.49	0	1
Health vocation	1st choice of study related to health	343	0.60	0.49	0	1
Attitude to income	Attitude towards income [a]	343	0.26	0.44	0	1
Attitude to rural	Attitude towards rural areas [b]	343	−0.03	1.52	−2.35	4.08

[a] Dummy variable that takes the value 1 if, when looking for a job, respondents place first "a good income so that you do not have any worries about money".

[b] Score created with Principle Component Analysis based on agreement (on a 6-point Lickert scale) with the following statements: "Working in rural areas is not stressful at all"; "Quality of life in rural areas is very good"; "The lifestyle you have in rural areas appeals to me"; "The social life in rural areas is enjoyable"; "Living in a city is stressful" (recoded).

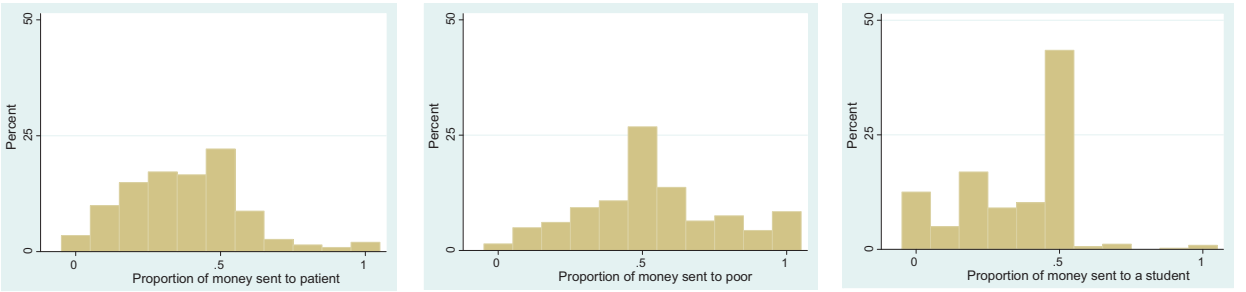

Fig. 2. Distribution of choices in the dictator games played with study participants.

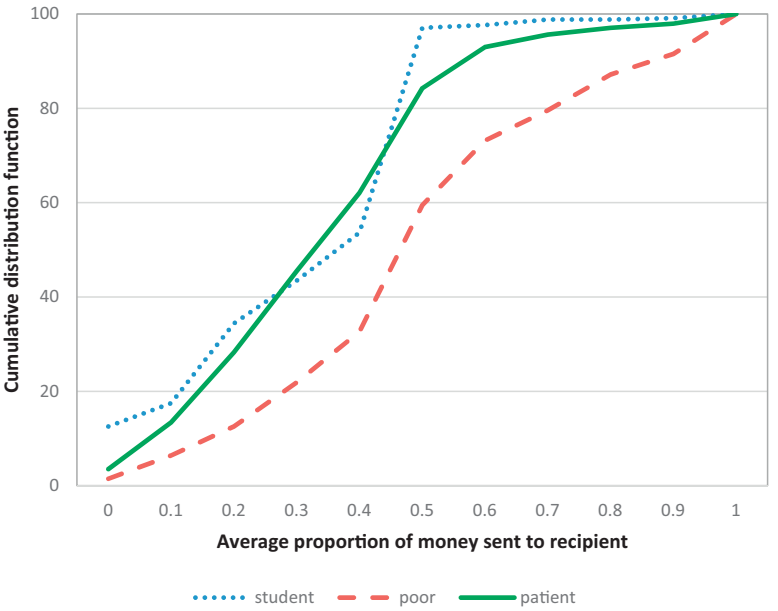

Fig. 3. Cumulative distribution functions of the decisions in the three dictator games played by respondents.

Table 4
Dedication towards patients and rural job choices.

	Any job in a rural area			Job in a rural health centre		
	(1)	(2)	(3)	(4)	(5)	(6)
Donation to patient	0.254**	0.263*	0.275**	0.230**	0.226**	0.240**
	(0.129)	(0.138)	(0.139)	(0.103)	(0.105)	(0.104)
Born rural	0.290***	0.279***	0.286***	0.156***	0.134***	0.129***
	(0.052)	(0.055)	(0.057)	(0.045)	(0.045)	(0.045)
Trained rural	0.438***	0.451***	0.461***	0.372***	0.373***	0.382***
	(0.051)	(0.053)	(0.054)	(0.048)	(0.050)	(0.051)
Salary		0.020	0.014		0.116	0.116
		(0.110)	(0.110)		(0.083)	(0.082)
Health vocation		−0.012	−0.006		−0.021	−0.022
		(0.057)	(0.057)		(0.044)	(0.043)
Age		0.008*	0.007*		0.004	0.004
		(0.004)	(0.004)		(0.003)	(0.003)
Male		0.028	0.014		0.053	0.037
		(0.081)	(0.080)		(0.066)	(0.064)
Black		0.178**	0.190***		0.143***	0.145***
		(0.072)	(0.068)		(0.035)	(0.033)
Married		0.097	0.102		0.080	0.080
		(0.066)	(0.067)		(0.052)	(0.052)
At least one child		−0.063	−0.062		−0.055	−0.052
		(0.073)	(0.073)		(0.057)	(0.057)
Attitude to income			0.127*			0.108*
			(0.071)			(0.057)
Attitude to rural			−0.006			0.005
			(0.018)			(0.013)
Observations	343	337	337	343	337	337
Log-likelihood	−146.7	−137.1	−135.2	−133.1	−123.8	−121.5
Pseudo R^2	0.313	0.352	0.360	0.281	0.325	0.338

Notes: All regressions are probit. Dependent variables are dummy variables for holding a job in a rural area, either in a hospital or in a health centre (columns 1–3) and holding a job in a rural health centre (columns 4–6). Donation to patient represents the proportion of money given by the respondent to a recipient identified as "a patient" in a dictator game played at baseline. Results present the marginal effects of each factor, or the marginal impact of each predictor on the probability of working in a rural area (columns 1–3) or on the probability of working in a rural health centre (columns 4–6). Standard errors are reported in parentheses. Observations vary due to missing data for the salary variable. Significance levels:

* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

Table 5
Pro-poor attitude and rural job choices.

	Any job in a rural area			Job in a rural health centre		
	(1)	(2)	(3)	(4)	(5)	(6)
Donation to poor	0.057	0.098	0.101	0.140	0.181**	0.182**
	(0.107)	(0.115)	(0.116)	(0.086)	(0.085)	(0.084)
Born rural	0.280***	0.271***	0.280***	0.153***	0.130***	0.128***
	(0.052)	(0.055)	(0.057)	(0.045)	(0.044)	(0.045)
Trained rural	0.436***	0.452***	0.461***	0.381***	0.387***	0.394***
	(0.052)	(0.054)	(0.054)	(0.049)	(0.051)	(0.052)
Salary (log)		0.028	0.019		0.121	0.117
		(0.111)	(0.111)		(0.082)	(0.081)
Health vocation		−0.006	0.001		−0.013	−0.013
		(0.057)	(0.057)		(0.042)	(0.042)
Age		0.008*	0.008*		0.005	0.005
		(0.004)	(0.004)		(0.003)	(0.003)
Male		0.019	0.007		0.053	0.039
		(0.080)	(0.080)		(0.065)	(0.063)
Black		0.179**	0.191***		0.149***	0.151***
		(0.073)	(0.069)		(0.032)	(0.030)
Married		0.098	0.104		0.076	0.075
		(0.066)	(0.067)		(0.051)	(0.051)
Has at least 1 child		−0.064	−0.064		−0.064	−0.063
		(0.073)	(0.074)		(0.057)	(0.057)
Attitude to income			0.118*			0.100*
			(0.070)			(0.055)
Attitude to rural			−0.010			0.000
			(0.018)			(0.013)
Observations	343	337	337	343	337	337
Log-likelihood	−148.5	−138.5	−136.8	−118.4	−123.9	−121.9
Pseudo R^2	0.305	0.345	0.353	0.216	0.325	0.336

Notes: All regressions are probit. Dependent variables are dummy variables for holding a job in a rural area, either in a hospital or in a health centre (columns 1–3) and holding a job in a rural health centre (columns 4–6). Donation to poor represents the proportion of money given by the respondent to a recipient identified as "a poor person" in a dictator game played at baseline. Results present the marginal effects of each factor, or the marginal impact of each predictor on the probability of working in a rural area (columns 1–3) or on the probability of working in a rural health centre (columns 4–6). Standard errors are reported in parentheses. Observations vary due to missing data for the salary variable. Significance levels:

* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

5.2. Nurses' dedication towards patients and rural job choices

Table 4 reports the marginal effects of several Probit estimations with the two different dependent variables defined earlier, with proportion of money sent to a patient ("dedication" towards patients) as the pro-social preference measure of interest. The results show consistent evidence of a positive association between dedication and the choice of a rural job. An increase in the donation made to patients in the DG by 10% translates to an increase in the probability of choosing a job in a rural area by 2.54–2.75 percentage points. A similar positive effect is found on the marginal probability of choosing a job in a rural health centre (between 2.26 and 2.40 percentage points).

Other demographic variables traditionally associated with a preference for rural jobs are also significant. Being born in a rural area increases the probability to take up a rural job (in a health centre) by 28.6 (12.9) percentage points. Similarly, having trained in the more rural province (North-West) increases the probability of being in a rural job (in a health centre) by 46.1 (38.2) percentage points. In addition, we also find that being black/African[19] and being older increases the probability of working in rural areas. Surprisingly a positive attitude towards rural lifestyle, expressed in 2008, is not associated with the choice of rural jobs.

5.3. Pro-poor generosity and rural job choices

Table 5 reports the marginal effects of several Probit estimations of the link between pro-poor attitude and rural job choices. We find no evidence supporting a link between a greater generosity towards poor people in the DG and holding any job in a rural area. However, there is some evidence that a pro-poor attitude in the DG is associated with holding a job in a rural health centre. More specifically, an increase in the donation to a poor person in the DG by 10% is associated

[19] As opposed to other ethnic groups usually used in South Africa: white, Indian, coloured. This result is probably driven by the fact that all white nurses in the sample work in urban areas.

Table 6
Altruism towards peers and rural job choices.

	Any job in a rural area			Job in a rural health centre		
	(1)	(2)	(3)	(4)	(5)	(6)
Donation to peer	0.148	0.106	0.135	0.042	0.039	0.045
	(0.135)	(0.147)	(0.149)	(0.106)	(0.109)	(0.109)
Born rural	0.279***	0.268***	0.278***	0.147***	0.125***	0.122***
	(0.052)	(0.055)	(0.057)	(0.045)	(0.044)	(0.045)
Trained rural	0.434***	0.447***	0.457***	0.367***	0.367***	0.374***
	(0.051)	(0.053)	(0.054)	(0.048)	(0.050)	(0.051)
Salary (log)		0.037	0.029		0.135	0.133
		(0.112)	(0.112)		(0.084)	(0.083)
Health vocation		−0.009	−0.002		−0.015	−0.015
		(0.057)	(0.057)		(0.044)	(0.043)
Age		0.008*	0.007*		0.005	0.005
		(0.004)	(0.004)		(0.003)	(0.003)
Male		0.016	0.005		0.041	0.027
		(0.080)	(0.080)		(0.065)	(0.062)
Black		0.174**	0.186***		0.145***	0.147***
		(0.075)	(0.070)		(0.036)	(0.034)
Married		0.102	0.109		0.084	0.083
		(0.066)	(0.067)		(0.052)	(0.052)
Has at least 1 child		−0.058	−0.058		−0.050	−0.049
		(0.073)	(0.073)		(0.057)	(0.057)
Attitude to income			0.122*			0.100*
			(0.071)			(0.056)
Attitude to rural			−0.011			0.002
			(0.018)			(0.013)
Observations	343	337	337	343	337	337
Log-likelihood	−148.0	−138.6	−136.8	−135.5	−126.1	−124.2
Pseudo R^2	0.307	0.344	0.353	0.268	0.313	0.323

Notes: All regressions are probit. Dependent variables are dummy variables for holding a job in a rural area, either in a hospital or in a health centre (columns 1–3) and holding a job in a rural health centre (columns 4–6). Donation to peer represents the proportion of money given by the respondent to another nursing student in a dictator game played at baseline. Results present the marginal effects of each factor, or the marginal impact of each predictor on the probability of working in a rural area (columns 1–3) or on the probability of working in a rural health centre (columns 4–6). Standard errors are reported in parentheses. Observations vary due to missing data for the salary variable. Significance levels:

* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

with an increase in the probability of working in a rural health centre by about 1.82 percentage points. The effects of other socio-demographic variables reported for the results of Table 4 also apply to the estimations reported here, with the most important effect found for the training location, followed by respondents' rural backgrounds.

5.4. Altruism towards peers and rural job choices

Table 6 reports the association between a generic measure of altruism from the DG (donation to other nursing students) and choice of rural jobs. Unlike what we found in the previous two specifications, there is no evidence that a greater generosity towards one's peers is predictive of a choice of rural jobs, either in general or in a health centre. This result gives additional support to the idea that it is not just altruism in the lab in general, but a willingness to sacrifice one's benefits for specific groups of individuals (patients, poor) that is likely to shape nurses' decisions outside the lab.

5.5. Testing simultaneously the role of all pro-social motives

Table 7 reports the results of regressions testing the simultaneous role of the three measures of pro-social motives providing further evidence on the relative explanatory power of each measure. While we do not favour these specifications due to unsurprising issues of collinearity between some of the measures (in particular the correlation between donations to patients and donations to poor people is 0.613),[20] they confirm the better explanatory power of the decisions to give money to patients in the lab. Indeed, only this measure of pro-social motive is found to be significant in predicting the choice of rural job choices.

[20] The other two correlation coefficients are: ρ peer/poor = 0.267; ρ peer/patient = 0.360.

Table 7
Simultaneous role of pro-social motives and rural job choices.

	Any job in a rural area		Job in a rural health centre	
	(1)	(2)	(3)	(4)
Donation to patient	0.312*	0.298*	0.218*	0.182
	(0.169)	(0.177)	(0.133)	(0.130)
Donation to poor	−0.114	−0.053	0.047	0.104
	(0.136)	(0.145)	(0.106)	(0.103)
Donation to peer	0.071	0.049	−0.059	−0.051
	(0.146)	(0.158)	(0.113)	(0.113)
Born rural	0.288***	0.285***	0.158***	0.130***
	(0.052)	(0.057)	(0.045)	(0.045)
Trained rural	0.431***	0.459***	0.376***	0.389***
	(0.052)	(0.055)	(0.049)	(0.053)
Other controls	No	Yes	No	Yes
Observations	343	337	343	337
Log-likelihood	−146.3	−135.1	−132.9	−120.9
Pseudo R^2	0.315	0.361	0.282	0.341

Notes: All regressions are probit. Dependent variables are dummy variables for holding a job in a rural area, either in a hospital or in a health centre (columns 1–2) and holding a job in a rural health centre (columns 3–4). Donation to patient/poor/peer represents the proportion of money given by the respondent to, respectively, a patient/a poor person/another nursing student in a dictator game played at baseline. Results present the marginal effects of each factor, or the marginal impact of each predictor on the probability of working in a rural area. Standard errors are reported in parentheses. Controls include dummies for being born in a rural area, having trained as a nurse in a rural province and having had a health-related field/profession as first choice of study, monthly (log) salary, age, male, black, married, having a child, a dummy variable indicating whether the respondent places income as the first thing to look for in a job, and a synthetic index capturing positive attitude towards rural lifestyle. Significance levels:

* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

6. Robustness checks

6.1. Alternative measures of pro-social preferences

Using the proportion of money sent to recipients as a measure of pro-social preference falsely assumes a linear relationship between the strength of pro-social motives and the probability of choosing a rural job. Not only is this not necessarily true, but it is difficult to test since this metric of pro-social preferences was built on the 11 ways of splitting the initial endowment imposed to participants in the DG. In addition, part of a donation in the DG might reflect something different from other-regarding preferences, for example "warm glow" (Andreoni et al., 2007) or some experimenter effect (Levitt and List, 2007). By contrast, one could argue that donating half of one's original endowment or more in the DG displays a stronger altruistic disposition towards the recipient. Therefore to test that our results are robust to this problem, we create two alternative series of pro-social measures. First we create a dummy variable equal to 1 if an individual shares 50% or more of their initial endowment in a DG. Second, to further test the non-linearity of pro-social motives, we create a series of three dummy variables corresponding to three levels of generosity defined according to the donations in each DG: low (shared 30% or less of one's endowment), medium (shared between 40–50%) and high generosity (gave 60% or more).[21]

The new results, presented in Table 8, concur with our previous findings and support the link between relevant measures of pro-social preferences in the lab and career decisions outside the lab. Results from the specifications using the binary variable (columns 1–3 and 7–9) show that sharing half or more than one's endowment with patients in the DG is associated with an increase in the probability of choosing a job in a rural area (in a rural health centre) by 17.4 (10.7) percentage points. Sharing half or more than one's endowment with a poor person in the DG is associated with a significant increase in the probability of choosing a job in a rural health centre (by 7.1 percentage points), but there is no evidence of effect on the probability of choosing any rural job. Looking at non-linear effects of pro-social motives towards patients and poor people (columns 4–5 and 10–11), one finds that in general the positive association between altruism in the lab and rural job choices outside the lab is driven by the more extreme generosity of some individuals who share 60% or more of their endowment. As before, we find that altruism towards peers is not associated with the choice of rural jobs, with any of the alternative measures of altruism towards one's peers (columns 3, 6, 9 and 12).

[21] We also ran specifications including individual dummies for all 11 possible ways of splitting the initial endowment, but this produced inconsistent results given the small and uneven numbers of individuals in each of the 11 categories.

Table 8
Non-linearity in pro-social motives and rural job choices.

	Any job in a rural area						Job in a rural health centre					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Gave ≥50% to patient	0.174***						0.107**					
	(0.063)						(0.049)					
Gave ≥50% to poor		0.012						0.071*				
		(0.059)						(0.039)				
Gave ≥50% to peer			−0.003						−0.025			
			(0.057)						(0.042)			
Gave 40–50% to patient				0.075						0.088**		
				(0.061)						(0.045)		
Gave ≥60% to patient				0.193*						0.117		
				(0.108)						(0.090)		
Gave 40–50% to poor					0.081						0.076	
					(0.084)						(0.062)	
Gave ≥60% to poor					0.130						0.161**	
					(0.091)						(0.073)	
Gave 40–50% to peer						0.029						0.041
						(0.059)						(0.043)
Gave ≥60% to peer						0.012						−0.041
						(0.159)						(0.088)
Controls	All	All	All	All	All	All	All	All	All	All	All	All
Observations	337	337	337	337	337	337	337	337	337	337	337	337
Log-likelihood	−133.1	−137.2	−137.2	−135.3	−136.1	−137.1	−121.5	−122.7	−124.1	−122.1	−121.1	−123.6
Pseudo R^2	0.370	0.351	0.351	0.360	0.356	0.351	0.338	0.331	0.324	0.334	0.340	0.327

Notes: All regressions are probit. Dependent variables are dummy variables for holding a job in a rural area, in any health care facility (columns 1–6) and holding a job in a rural health centre (columns 7–12). Measures of pro-social motives are dummy variables for sharing at least 50% of the initial endowment (columns 1–3 and 7–9), and two dummy variables for sharing 40–50% or 60% or more of the initial endowment (columns 4–6 and 10–12). Results present the marginal effects of each factor, or the marginal impact of each predictor on the probability of working in a rural area. Standard errors are reported in parentheses. Controls include dummies for being born in a rural area, having trained as a nurse in a rural province and having had a health-related field/profession as first choice of study, monthly (log) salary, age, male, black, married, having a child, a dummy variable indicating whether the respondent places income as the first thing to look for in a job, and a synthetic index capturing positive attitude towards rural lifestyle. Significance levels:

* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

6.2. *Self-selection of altruists into rural jobs or skilled workers into urban jobs?*

There is evidence showing that incremental returns to an urban environment are greater for high skilled workers than for those with lower skills (Glaeser and Resseger, 2010). One of the reasons is that the cost of living in cities acts as a self-selection mechanism: high ability workers choose to live in a high cost city, and low ability workers are mainly located in a low cost environment. This issue is only a problem if we assume that higher-skilled nurses are also less pro-socially motivated, and that dedication towards patients acts like a default strategy for those who cannot get high returns from their skills, so instead "choose" to get higher returns differently.

We cannot test that assumption directly as there is no information available in the data to create a measure of nurses' skills. But urban areas will attract more high-skilled workers only if salaries are relatively flexible so that high-skilled workers will indeed earn more. This may not be possible for early career nurses in the public sector, where salaries are centrally set, and rapid and significant promotions highly unlikely to occur at such an early stage in nurses' career. By contrast, the private sector offers more flexible salaries that are likely to reflect skills better. High-skilled nurses are therefore likely to self-select into private jobs. Therefore, if excluding private sector nurses from the sample is likely to leave us with a more homogenous nursing population in terms of skills.

Therefore, we re-estimated the full models restricting the sample to nurses working in the public sector, to see if dedication towards patients still had an impact on rural job choices. The results presented in Table 9 provide evidence supporting the existence of the self-selection mechanism of altruistic individuals towards patients and poor in the lab into the more difficult rural jobs. Looking at predictors of the choice of a rural job in any type of facility (columns 1–3), the effect of a pro-social attitude towards patients established in the whole population (see Table 4), is no longer significant in this sub-group ($p = 14.6$). However, the determinants of working in a rural health centre (columns 4–6), presumably a more difficult and isolated post that also provides great benefits to patients in the catchment area show consistent results with those observed in the full sample. They confirm that dedication towards patients in the lab is positively associated with holding a job in a rural health centre (column 4), as is a pro-poor attitude (column 5), and the size of these effects in the population of public sector nurses is the same as, or larger than those observed in the full sample.

These results provide evidence supporting the idea that the self-selection mechanism of altruists into more difficult jobs is not just the default strategy employed by those individuals who cannot get better jobs elsewhere.

Table 9
Pro-social motives and rural job choices amongst public sector nurses.

	Any job in a rural area			Job in a rural health centre		
	(1)	(2)	(3)	(4)	(5)	(6)
Donation to patient	0.236			0.243**		
	(0.162)			(0.123)		
Donation to poor		0.147			0.243**	
		(0.134)			(0.101)	
Donation to peer			0.225			0.079
			(0.174)			(0.131)
Born rural	0.314***	0.313***	0.309***	0.162***	0.165***	0.156***
	(0.063)	(0.063)	(0.063)	(0.052)	(0.052)	(0.052)
Trained rural	0.515***	0.524***	0.521***	0.415***	0.437***	0.414***
	(0.056)	(0.057)	(0.057)	(0.056)	(0.057)	(0.056)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	298	298	298	298	298	298
Log-likelihood	−119.4	−119.8	−119.6	−111.0	−110.0	−112.7
Pseudo R^2	0.383	0.380	0.382	0.352	0.358	0.342

Notes: All regressions are probit. Dependent variables are dummy variables for holding a job in a rural area, either in a hospital or in a health centre (columns 1–3) and holding a job in a rural health centre (columns 4–6). The sample includes only nurses who hold a job in the public sector. Results present the marginal effects of each factor, or the marginal impact of each predictor on the probability of working in a rural area (columns 1–3) or on the probability of working in a rural health centre (columns 4–6). Standard errors are reported in parentheses. Controls include a dummy for having had a health-related field/profession as first choice of study, monthly (log) salary, age, male, black, married, having a child, a dummy variable indicating whether the respondent places income as the first thing to look for in a job, and a synthetic index capturing positive attitude towards rural lifestyle. Significance levels:
* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

6.3. Dedicated nurses vs. nurses by default

We know from the baseline survey that not all nurses in the sample chose to embrace this profession full-heartedly. In fact, Table 10 shows that only 42% wanted to study nursing, with just an additional 18% who wanted to embrace a health profession looking after patients (e.g. doctors, physiotherapists, etc.). For the rest of the sample, Table 10 shows the variety of studies and careers that some individuals would have preferred to nursing. In particular, many originally wanted not only to embark on a professional carer where they would not have dealt with patients at all, but also where financial returns would potentially have been higher (e.g. accounting, law, marketing, etc.). We could hypothesise that these individuals, who are health care providers not by choice but by default, are likely to care less about patients and their welfare than those who wanted to become health care providers above anything else in the first place. Indeed, we find that the donations to patients are slightly lower for those nurses "by default", who give on average 35.8% of their endowment compared to 39.2% for the nurses "by vocation" ($p < 0.058$).

Therefore, the self-selection of dedicated nurses into rural jobs may partly reflect the fact that the nurses generous towards patients in the DG are also those who were really motivated by a health-related career where they could serve patients. Although we did control for this variable in all econometric specifications, some collinearity issue might remain. Submitting our results to a more robust test, we re-estimated our specification with all controls with the sub-sample of individuals who were motivated to work in the health sector, that is those whose first choice of study was either nursing ($N = 144$), medicine ($N = 36$) or another health-related field or profession ($N = 27$).

Table 11 reports the results of these estimations, which confirm the existence of some association between relevant altruism in the lab and career choices. Even though, unlike what was found in the whole sample, the experimental measure of pro-social motives towards patients no longer predict the choice made by nurses to work in a rural area in any facility

Table 10
Self-reported first choice of study.

	N	%
Nursing	144	41.98
Medicine	36	10.50
Other health-related studies[a]	27	7.87
Social professions[b]	33	9.62
Business/law	37	10.79
Other[c]	55	16.03
Didn't know/answer	11	3.21
TOTAL	343	100

[a] Physiotherapy, nutrition, etc.
[b] Teaching, psychology, etc.
[c] Engineering, mathematics, physics, etc.

Table 11
pro-social motives and choice of rural jobs amongst "motivated" nurses.

	Any job in a rural area			Job in a rural health centre		
	(1)	(2)	(3)	(4)	(5)	(6)
Donation to patient	0.238			0.329**		
	(0.199)			(0.149)		
Donation to poor		0.172			0.263**	
		(0.166)			(0.116)	
Donation to peer			0.253			0.138
			(0.205)			(0.147)
Born rural	0.396***	0.399***	0.398***	0.104*	0.111*	0.117*
	(0.075)	(0.075)	(0.075)	(0.063)	(0.061)	(0.062)
Trained rural	0.429***	0.442***	0.427***	0.424***	0.445***	0.409***
	(0.070)	(0.072)	(0.070)	(0.065)	(0.066)	(0.063)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	203	203	203	203	203	203
Log-likelihood	−75.56	−75.75	−75.51	−70.50	−70.49	−72.74
Pseudo R^2	0.430	0.429	0.431	0.395	0.395	0.376

Notes: All regressions are probit. Dependent variables are dummy variables for holding a job in a rural area, either in any health care facility (columns 1–3) and holding a job in a rural health centre (columns 4–6). The sample includes only nurses who indicated that their first choice of study was in relation to a health profession/field (e.g. nursing, medicine, physiotherapy, etc.). Results present the marginal effects of each factor, or the marginal impact of each predictor on the probability of working in a rural area in any facility (columns 1–3) or on the probability of working in a rural health centre (columns 4–6). Standard errors are reported in parentheses. Controls include monthly (log) salary, age, male, black, married, having a child, a dummy variable indicating whether the respondent places income as the first thing to look for in a job, and a synthetic index capturing positive attitude towards rural lifestyle. Significance levels:

* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

(column 1), dedication towards patients is positively associated with holding a job in a rural health centre (column 4), as is a pro-poor attitude (column 5). In fact, these marginal effects are even stronger in that sub-group, with a 10% increase in the donation to patients (poor people) in the DG associated with an increase in the probability of choosing a job in a rural health centre by 3.29 (2.63) percentage points. In the whole sample, the same effects were respectively estimated to be 2.40 and 1.82. Finally, the specifications including measures of generosity towards peer (columns 3 and 6) confirm the lack of significance of that less specific experimental measure of pro-social motives on career choices.

These results overall suggest that, in a group of more intrinsically motivated and dedicated individuals, altruism (as measured in the lab) may only be discriminating enough for the more dramatic career decisions, involving greater self-sacrifice.

7. Discussion and conclusion

This study presents the first empirical test of the role of pro-social preferences measured in the lab in the choice of jobs in deprived rural areas. Applied to the context of young nurses in South Africa, it explores the extent to which pro-social motives observed in the lab are predictors of career choices.

The findings show that health workers who display higher levels of dedication towards patients in the lab are more likely to choose to work in rural areas, where their personal and professional lives are objectively more difficult. This result was particularly strong and consistent when looking at the relationship between dedication towards patients in the lab and rural jobs in health centres. We also found consistent evidence that generosity towards poor people in the lab was associated with choosing to work in a rural health centre. Two reasons probably explain this stronger association. First, the benefits derived by patients from the presence of a nurse are likely to be even greater than in hospitals. The latter are indeed typically staffed with several doctors and nurses, while it is not rare for nurses to be the only health care professional in health centres. Second, rural health centres are also located in more remote areas, where geographic barriers to access to alternative health care providers are greater. The presence of a professional nurse therefore makes a significant difference to the life of potential patients in the catchment area, more so than for rural hospitals.

These findings have potential policy implications in South Africa. To ensure that a higher proportion of nurses are willing to choose rural posts, the recruitment processes of nursing students could try and ascertain the extent to which potential candidates show signs of dedication towards patients, or a commitment to improving patients' wellbeing. Alternatively, assuming that dedication to patients can be nurtured, nurses' curricula and experience during their studies could be adapted to cultivate positive attitudes towards patients.

Finally, we found no evidence that pro-social preferences not specific to the particular decision-making context of nurses were relevant to their labour supply decisions. Specifically, generic altruistic decisions observed in a standard DG where the dictator sends money to fellow students, was never a predictor of job choices outside the lab. This finding suggests that lightly framed experiments might more relevant to explore the impact of social preferences on decisions made outside of

the lab. This is particularly true for the investigation of the role of other-regarding preferences in a particular social setting, which can only be introduced in experimental economics by abandoning some degree of abstraction.

This study contributes to the limited evidence on the relationships between decisions observed in the lab and choices made in real life, although the strength of the relationship observed here might be due to the particular characteristics of the population studied (nurses). With experimental (Jacobsen et al., 2011) and anecdotal (Miers et al., 2007; Shaw and Degazon, 2008) evidence suggesting that nurses are likely to be more altruistic than the general population, does it make studying the role of social preferences in career decisions in that population less relevant or interesting? We believe not. In fact, if anything, detecting a relationship between pro-social motivation in the lab and career choices might be more difficult (and therefore more meaningful when detected) in a more altruistic population where one might observe more less variation in altruistic behaviour in the lab. What is more specific to nurses however, is the fact that part of their motivation to work is directly linked to social preferences, i.e. helping and serving others, more specifically patients. It is precisely the reason why they were a particularly relevant and interesting population in which to study relationships between social preferences in the lab and career decisions outside the lab. It would be interesting for further research to study the extent to which one can observe the same link between social preferences in the lab and career decisions made by individuals who are likely to choose their profession partly to benefit others (medical doctors, teachers).

References

Aguiar, F., Brañas-Garza, P., Miller, L.M., 2008. Moral distance in dictator games. Judgm. Decis. Mak. 3 (4), 344–354.
Andreoni, J., Harbaugh, W.T., Vesterlund, L., 2007. Altruism in experiments. New Palgrave Dict. Econ.
Bénabou, R., Tirole, J., 2006. Incentives and prosocial behaviour. Am. Econ. Rev. 96 (5), 1652–1678.
Besley, T., Ghatak, M., 2005. Competition and incentives with motivated agents. Am. Econ. Rev. 95, 616–636.
Bradshaw, D., 2008. Determinants of health and related indicators. In: Health Systems Trust (Ed.), South African Health Review. Health Systems Trust, Durban.
Brañas-Garza, P., 2006. Poverty in dictator games: awakening solidarity. J. Econ. Behav. Organ. 60 (3), 306–320.
Breier, M., Wildschut, A., Mgqolozana, T., 2009. Nursing in a New Era The Profession and Education of Nurses in South Africa. Human Sciences Research Council, Cape Town.
Camerer, C., 2003. Behavioral Game Theory: Experiments in Strategic Interaction. Princeton University Press, Princeton, NJ.
Camerer, C., Fehr, E., 2002. Measuring social norms and preferences using experimental games: a guide for social scientists. In: Henrich, J., Boyd, R., Bowles, S., Gintis, H., Fehr, E., et al. (Eds.), Foundations of Human Sociality: Experimental and Ethnographic Evidence From 15 Small-Scale Societies. Oxford University Press, Oxford.
Carpenter, J., Seki, E., 2011. Do social preferences increase productivity? Field experimental evidence from fishermen in Toyama Bay. Econ. Enq. 49 (2), 612–630.
Clark, S.J., Collinson, M.A., Kahn, K., Drullinger, K., Tollman, S.M., 2007. Returning home to die: circular labour migration and mortality in South Africa. Scand. J. Public Health 69, 35–44.
Cooper, D.J., Kagel, J.H., 2013. Other regarding preferences: a selective survey of experimental results. In: John, H., Kagel, A., Roth, E. (Eds.), The Handbook of Experimental Economics. Princeton University Press.
Coovadia, H., Jewkes, R., Barron, P., Sanders, D., McIntyre, D., 2009. The health and health system of South Africa: historical roots of current public health challenges. Lancet 374 (9692), 817–834.
Day, C., Gray, A.M., 2010. Health and related indicators. In: Fonn, S., Padarath, A. (Eds.), South African Health Review 2010. Health Systems Trust, Durban.
Delfgaauw, J., 2007. Dedicated Doctors: Public and Private Provision of Health Care with Altruistic Physicians, Erasmus School of Economics. Erasmus Universiteit Rotterdam and Tinbergen Institute, Rotterdam.
Delfgaauw, J., Dur, R., 2008. Incentives and workers' motivation in the public sector. Econ. J. 118 (525), 171–191.
Delobelle, P., Rawlinson, J.L., Ntuli, S., Malatsi, I., Decock, R., et al., 2011. Job satisfaction and turnover intent of primary healthcare nurses in rural South Africa: a questionnaire survey. J. Adv. Nurs. 67 (2), 371–383, http://dx.doi.org/10.1111/j.1365-2648.2010.05496.x (Epub 02010 Nov 05492).
Department for Public Service and Administration, 2008. In: Department for Public Service and Administration (Ed.), Occupation Specific Dispensation – Professional Nurse, Pretoria.
Dussault, G., Franceschini, M.C., 2007. Not enough there, too many here: understanding geographical imbalances in the distribution of the health workforce. Hum. Resour. Health 4 (12), 1–16.
Eckel, C., Grossman, P., 1996. Altruism in anonymous dictator games. Games Econ. Behav. 16 (2), 181–191.
Ehlers, V.J., 2003. Professional nurses' requests to remove their names from the South African Council's register. Part 1: Introduction and literature review. Health SA Gesondheid 8 (2), 63–69.
Erasmus, B.J., 1998. Nursing professionals' views on the workplace. Curationis, 50–57.
Erasmus, B.J., Brevis, T., 2005. Aspects of the working life of women in the nursing profession in South Africa: survey results. Curationis 28 (2), 51–60.
Fafchamps, M., Shilpi, F., 2009. Isolation and subjective welfare: evidence from South Asia. Econ. Dev. Cult. Change 57 (4), 641–683.
Forsythe, R., Horowitz, J., Savin, N.E., Sefton, M., 1994. Fairness in simple bargaining experiments. Games Econ. Behav. 6, 347–369.
Francois, P., Vlassopoulos, M., 2008. Pro-social motivation and the delivery of social services. CESifo Econ. Stud. 54 (1), 22–54.
Frehywot, S., Mullan, F., Payne, P.W., Ross, H., 2010. Compulsory service programmes for recruiting health workers in remote and rural areas: do they work? Bull. World Health Organ. 88 (5).
Gaede, B., Versteeg, M., 2011. The state of the right to health in rural South Africa. In: Health Systems Trust (Ed.), South African Health Review. Health Systems trust, Durban.
Glaeser, E.L., Resseger, M.G., 2010. The complementarity between cities and skills. J. Regional Sci. 50, 221–244.
Gregg, P., Grout, P.A., Ratcliffe, A., Smith, S., Windmeijer, F., 2011. How important is pro-social behaviour in the delivery of public services? J. Public Econ. 95 (7–8), 758–766.
Grobler, L., Marais, B.J., Mabunda, S.A., Marindi, P.N., Reuter, H., et al., 2009. Interventions for increasing the proportion of health professionals practising in rural and other underserved areas. Cochrane Database Syst. Rev. 1.
Hall, E.J., 2004. Nursing attrition and the work environment in South African health facilities. Curationis 27 (4), 28–36.
Hammer, J., Jack, W., 2002. Designing incentives for rural health care providers in developing countries. J. Dev. Econ. 69 (1), 297–303.
Hedges, J., 2002. The importance of posting and interaction with the education Bureaucracy in becoming a teacher in Ghana. Int. J. Educ. Dev. 22 (3–4), 353–366.
Jacobsen, K., Eika, K., Helland, L., Lind, J., Nyborg, K., 2011. Are nurses more altruistic than real estate brokers? J. Econ. Psychol. 32, 818–831.
Jalan, J., Ravallion, M., 2002. Geographic poverty traps? A micro model of consumption growth in rural China. J. Appl. Econ. 17, 329–346.
Kanbur, R., Venables, T., 2005. Spatial inequality and development. J. Econ. Geogr. 5 (1), 1–2.
Karlan, D.S., 2005. Using experimental economics to measure social capital and predict financial decisions. Am. Econ. Rev. 95 (5), 1688–1699.

Kok, P., Collinson, M., 2006. Migration and Urbanisation in South Africa. Statistics South Africa, Pretoria.
Kolstad, J.R., Lindkvist, I., 2012. Pro-social preferences and self-selection into the public health sector: evidence from an economic experiment. Health Policy Plan.
Laven, G., Wilkinson, D., 2003. Rural doctors and rural backgrounds: how strong is the evidence? A systematic review. Aust. J. Rural Health 11 (6), 277–284.
Lehmann, U., Dieleman, M., Martineau, T., 2008. Staffing remote rural areas in middle- and low-income countries: a literature review of attraction and retention. BMC Health Serv. Res. 8 (19), 1–10.
Leibbrandt, M., Woolard, I., Finn, A., Argent, J., 2010. Trends in South African Income Distribution and Poverty Since the Fall of Apartheid OECD, Paris, France.
Levitt, S.D., List, J.A., 2007. What do laboratory experiments measuring social preferences reveal about the real world? J. Econ. Perspect. 21, 153–174.
McIntyre, D., Thiede, M., Nkosi, M., Mutyambizi, V., Castillo-Riquelme, M., et al., 2007. A Critical Analysis of the Current South African Health System, Health Economics Unit. University of Cape Town and Centre for Health Policy, University of the Witwatersrand, Cape Town.
Meier, S., 2006. A Survey of Economic Theories and Field Evidence on Pro-social Behavior, Working Papers 06-6. Federal Reserve Bank of Boston, Boston.
Miers, M.E., Rickaby, C.E., Pollard, K.C., 2007. Career choices in health care: is nursing a special case? A content analysis of survey data. Int. J. Nurs. Stud. 44 (7), 1196–1209.
Mokoka, K.E., 2007. Factors Affecting the Retention of Professional Nurses in the Gauteng Province. University of South Africa, Department of Health Studies, Johannesburg.
Mulkeen, A., Chen, D., 2008. Teachers for Rural Schools. Experiences in Lesotho, Malawi, Mozambique, Tanzania, and Uganda. World Bank, Washington, DC.
Ntsaluba, A., Pillay, Y., 1998. Reconstructing and developing the health system – the first 1000 days. S. Afr. Med. J. 88 (1), 33–36.
Penn-Kekana, L., Blaauw, D., San Tint, K., Monareng, D., Chege, J., 2005. Nursing Staff Dynamics and Implications for Maternal Health Provision in Public Health Facilities in the Context of HIV/AIDS, Centre for Health Policy, School of Public Health. University of the Witwatersrand.
Perry, J.L., Wise, L.R., 1990. The motivational bases of public service. Public Adm. Rev. 50 (3), 367–373.
Reid, S.J., Chabikuli, N., Jaques, P.H., Fehrsen, G.S., 1999. The procedural skills of rural hospital doctors. S. Afr. Med. J. 89 (7), 769–774.
Ross, A.J., Couper, I.D., 2004. Rural scholarship schemes: a solution to the human resource crisis in rural district hospitals. S. Afr. Fam. Pract. 46 (1), 5–6.
Rotolo, T., Wilson, J., 2006. Employment sector and volunteering: the contribution of nonprofit and public sector workers to the volunteer labour force. Sociol. Q. 47 (1), 21–40.
SANC, 2008. Geographical Distribution of the Population of South Africa versus Nursing Manpower. South African Nursing Council, Pretoria.
Schoeman, S., Faber, M., Van Stuijvenberg, M., Smuts, C.M., Oelofse, A., et al., 2010. Primary health care facility infrastructure and services and the nutritional status of children 0–71 months old and their caregivers attending these facilities in four rural districts in the Eastern Cape and KwaZulu-Natal provinces, South Africa. S. Afr. J. Clin. Nutr. 23 (1), 21–27.
Sempowski, I.P., 2004. Effectiveness of financial incentives in exchange for rural and underserviced area return-of-service commitments: systematic review of the literature. Can. J. Rural Med. 9 (2), 82–88.
Serneels, P., Lindelow, M., Garcia-Montalvo, J., Barr, A., 2007. For public service or money: understanding geographical imbalances in the health workforce. Health Policy Plan. 22 (3), 128–138.
Serra, D., Serneels, P., Barr, A., 2010. Intrinsic motivation and the nonprofit health sector. Pers. Indiv. Differ. 31 (2), 309–314.
Shaw, H.K., Degazon, C., 2008. Integrating the core professional values of nursing: a profession, not just a career. J. Cult. Divers. 15 (1), 44–50.
Shisana, O., Hall, E., Maluleke, K.R., Stoker, D.J., Schwabe, C., et al., 2003. The Impact of HIV/AIDS on the Health Sector: National Survey of Health Personnel, Ambulatory and Hospitalised Patients and Health Facilities, 2002. Report Prepared for the South African Department of Health. HSRC Press, Cape Town.
Statistics South Africa, 2008. General Household Survey. Statistics South Africa, Pretoria.
Statistics South Africa, 2012. Census 2011. Statistics South Africa, Pretoria.
Wildschut, A., Mqolozana, T., 2008. Shortage of Nurses in South Africa: Relative or Absolute? Department of Labour, Pretoria, South Africa.
Wilson, N.W., Couper, I.D., De Vries, E., Reid, S., Fish, T., et al., 2009. A critical review of interventions to redress the inequitable distribution of healthcare professionals to rural and remote areas. Rural Remote Health 9 (2), 1060.