A land of milk and honey with streets paved with gold: Do emigrants have over-optimistic expectations about incomes abroad?[*]

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Abstract

Millions of people emigrate every year in search of better opportunities. Anecdotes of emigrants with over-optimistic expectations about the incomes they can earn abroad suggest excessive migration pressure. Yet there is almost no statistical evidence on how accurately emigrants predict the incomes that they will earn working abroad. In this paper, we combine a natural emigration experiment with unique survey data on would-be emigrants' probabilistic expectations about employment and incomes in the migration destination. Our procedure enables us to obtain moments and quantiles of the subjective distribution of expected earnings in the destination country. We find significant under-estimation of both unconditional and conditional labor earnings at all points in the distribution for males, but reasonably accurate expectations for females. This under-estimation appears driven in part by inaccurate information flows from extended family, by basing expectations on older cohorts, and by differences in the gender wage premium between source and origin countries.

Keywords: Expectations; Migration; Natural Experiment
JEL codes: O12, D84, F22, J61

[*] Financial support from the World Bank and Marsden Fund grant UOW0503 is gratefully acknowledged. We thank the Government of the Kingdom of Tonga for survey permission, the New Zealand Department of Labour Immigration Service for providing the sampling frame, Halahingano Rohorua and her assistants for excellent survey work and helpful comments on this paper, and the survey respondents. Helpful comments were received from the editors, two anonymous referees, Mary Adams, Jishnu Das, Betty-Ann Kelly, Helen Lee, John Roseveare and various seminar participants. The views expressed here are those of the authors alone and do not necessarily reflect the opinions of the World Bank, the New Zealand Department of Labour, or the Government of Tonga.
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"Fortunes are being made by taking the life savings off gullible people in return for getting them, illegally, into a country like Britain. The sales talk is doubtless about a land flowing with milk and honey, and streets paved with gold." *The Campaign for Political Ecology*[1]

"…for our relatives who live in the isle, in their small minds they think that money grow[s] out of trees, and thus expect people overseas to provide them with their need[s]…Tongans returning home for visits make the situation worse by exaggerating their success and wealth and creating unrealistic expectations"

Tongan online discussion group (quoted in Lee,2003, p. 36)

Does migration make people better off? Revealed preference would suggest yes, as evidenced by the large number of people choosing to pursue life in a different land each year. However, as the above quotes illustrate, some critics contend that migrants may hold unrealistic expectations of the incomes they can earn abroad. Such expectations may be inflated by television and film images of life abroad (Mai, 2004, Braga, 2010), and by returning migrants presenting an overly positive image of their lives overseas. For example, Douglas Massey (2006, p.114) writes that a main theme of sociologist Abdelmalek Sayad's (2004) work on Algerian immigration to France is that of deception: "Emigrants simultaneously deceive their compatriots left behind by selectively reporting on their lives abroad, maximizing successes while minimizing their failures and frustrations, thus inducing others to leave with excessive optimism". As a result, it could be the case that many intending migrants overestimate the incomes they can earn abroad.

Overly optimistic expectations about incomes abroad could account for growing migration pressures around the world. For example, a recent Gallup World Poll found 16 percent of the World's adults, or 700 million people, express a desire to migrate permanently to another

[1] http://eco.gn.apc.org/Population/immigration.html

country.[2] Since the global stock of emigrants is only 210 million (UN, 2009), there appears to be a very substantial unmet demand for international migration opportunities. But if based on mistaken beliefs about the incomes that can be earned abroad, migration may lead to disappointment and frustration for the migrant, resulting in social problems in the destination country. More accurate information on earnings abroad could therefore help lower migration pressures.

On the other hand, despite stated demand for migration, emigrants are just a small share of the world's population. Migration barriers may bind for the unskilled, but the massive income gains to skilled migrants (Gibson and McKenzie, 2011) and competition amongst destinations (Kapur and McHale, 2005) raises the question of why so few people leave their country of birth. Moreover, many migrants who plan on staying abroad for only a short-time end up never returning to their home countries, while others who gain first-hand experience of a destination country in their youth (e.g., as exchange students) often return to work in that country (Parey and Waldinger, 2011). One possible explanation for these facts could be that many potential migrants actually underestimate how much better off they could be abroad, and only learn if they spend time in a foreign labor market. In that case, if people underestimate the gains to migration, pressure to migrate may increase as globalization and media innovation increase the information that people have about possibilities abroad.

This paper uses unique survey data combined with a natural experiment in order to assess the accuracy of these concerns by determining whether potential emigrants have correct expectations about the incomes they would earn working abroad. We survey Tongans who applied to emigrate to New Zealand under the Pacific Access Category (PAC), which allows a

[2] See http://www.gallup.com/poll/124028/700-Million-Worldwide-Desire-Migrate-Permanently.aspx [accessed September 9, 2010]

quota of Tongans to immigrate each year. Approximately ten people apply for every place in the quota, and so a lottery (referred to as a ballot) is used to determine who can emigrate. We elicited expectations about employment and income in New Zealand from individuals in Tonga who had applied to emigrate but whose names were not chosen in the ballot. This was done by adapting the probabilistic expectations questions used by Dominitz and Manski (1997), Dominitz (1998) and Manski (2004). We are the first study we are aware of to use this methodology for eliciting expectations in a developing country context.[3] These responses are then used to estimate the subjective distribution of earnings in New Zealand of ballot losers, which can be compared to the distribution of earnings realized by the ballot winners who emigrated.

In contrast to the concern that potential migrants could be over-optimistic, we find striking evidence that potential male migrants underestimate both the odds of being employed and the incomes that they could earn if employed abroad, while potential female migrants have fairly accurate expectations. The mean percent chance of being employed in New Zealand expressed by the male ballot losers is 55 percent, compared to a 90.5 percent actual employment rate among male emigrant ballot winners. The means of the mean and median expected weekly earnings in New Zealand for males conditional on being employed are $339 and $290, much less than the actual mean ($558) and median ($500) incomes earned by the male ballot winners. Combining the expectations of employment with the conditional earnings distribution, we arrive at mean unconditional expected earnings for males which are only 37 percent of the actual mean earnings of male immigrants in New Zealand.

We show that expected earnings are predictive of whether or not individuals apply to migrate, and then explore several explanations for the underestimation of employment

[3] Attanasio and Kaufman (2009) and other ongoing work by Attanasio also elicit subjective expectations in a similar way, but they differ from Manski in the way they fit a distribution (see Delavande et al. (2011) for more discussion of this).

likelihoods and expected earnings by men. We find that there is a large male wage premium for Tongans working in New Zealand, whereas males and females earn similar amounts in Tonga. Male migrants in New Zealand had enjoyed rapid income growth in the decade prior to our survey, whereas female earnings had been stagnant. Despite the large networks, it appears more recent information about earnings had not filtered through to potential migrants in Tonga. Moreover, the degree of underestimation of earnings is greater when men have cousins, uncles and aunts in New Zealand compared with those who either have no relatives or who have immediate family in New Zealand. The anthropological literature on the Tongan diaspora (Lee, 2003), shows that the extended family can place large demands for remittances on migrants. We view the underestimation of earnings by potential migrants with extended family abroad as suggestive evidence that immigrants mitigate this remittance pressure by understating or not revealing their earnings when communicating with their extended family in Tonga.

Emigration rates are largest for small countries. Tonga therefore provides a useful context for learning about the expectations of potential migrants from a setting where migration is important. Moreover, Tonga is a country in which over three-quarters of households have at least one resident who has been to New Zealand, with a migrant stock in New Zealand equal to 17 percent of its population at home and where 75 percent of households receive remittances. Thus, given that we still do not find accurate expectations in such a setting, it seems reasonable to believe that one is likely to also find incorrect expectations about potential incomes abroad in other countries, in which migrant links and information networks are smaller.

The paper also contributes to a nascent literature on measuring expectations in developing countries. Attanasio (2009) and Delavande et al. (2011) provide recent reviews of this literature. Much of the initial work has been in agricultural contexts, asking farmers about

events in which the respondents have substantial existing experience. Examples include Lusano et al. (2003), Lybbert et al. (2007), and Gine et al. (2009) on rainfall expectations, Santos and Barrett (2006) on herd size, and Hill (2010) on coffee prices. These studies have generally found reasonably accurate expectations, with updating in response to new information.

In contrast, our paper focuses on an important life event in which individuals do not have prior experience. Two recent papers written in parallel to this also form this new branch of the literature. Attanasio and Kaufman (2009) consider expectations about earnings conditional on educational outcomes in Mexico, and Delavande and Kohler (2009) consider mortality and HIV expectations in Malawi. The emerging consensus from these studies and ours is that expectations can be considerably less accurate for important life events for which the individual has not had much prior experience. The implication is that simple information interventions may offer the potential to change behavior significantly, as in Jensen (2009).

The remainder of the paper is structured as follows. Section 2 describes the context for the Pacific Access Category migration flow and the survey upon which this paper is based. Section 3 outlines in detail how expectations are measured. Sections 4 and 5 compare expectations about employment and income in New Zealand to the actual distributions experienced by migrants. Section 6 then explores several explanations for the difference between actual and expected work outcomes, and Section 7 concludes.

2. Description of the Context, Survey, and Experimental Design

2.1 Background

The Kingdom of Tonga is an archipelago of islands, three hours north of New Zealand by airplane. The resident population is just over 100,000, with a GDP per capita of over US$2,200

in PPP terms. Emigration levels are high, with 30,000 Tongan-born living abroad, mostly in New Zealand, Australia and the United States. Migration to New Zealand began with Tongans on temporary work permits during the 1960s and 1970s. Some over-stayed, with a 1976 amnesty granting many of these individuals permanent residence. Migration for work continued into the 1980s, and by 1986 the population of Tongans in New Zealand reached 13,600. However, in 1991, New Zealand introduced a selection system for immigration, with potential migrants given points for education, skills, and business capital. Few Tongans qualified under this system, so most migration in the 1990s was under family sponsored categories—as the spouse, parent, or child of an existing migrant. For example, in 1997/98 just 29 Tongans entered as principal applicants under the points system, versus 436 under family categories. With family migration, the Tongan-born population in New Zealand reached 19,000 in the 2001 Census.

2.2 The Pacific Access Category

In 2002, another channel opened up for migration to New Zealand through the creation of the Pacific Access Category (PAC). This allows for a quota of 250 Tongans to immigrate to New Zealand each year regardless of their skill level or socioeconomic status.[4] Specifically, any Tongan citizens aged between 18 and 45 can register to immigrate to New Zealand.[5] The registration fee is just NZ$50 (US$40) per family, and re-registration in subsequent years is allowed at the lower rate of NZ$20. More applications are received than the quota allows, so a random ballot is used by the New Zealand Department of Labour (DoL) to select from amongst the registrations. Winning ballot numbers are broadcast and published in newspapers and at New

[4] The Pacific Access Category also provides quotas for 75 citizens from Kiribati, 75 citizens from Tuvalu, and, prior to the December 2006 coup, 250 citizens from Fiji to migrate to New Zealand.

[5] The person who registers is a Principal Applicant. If they are successful, their immediate family (spouse and children under age 24) can also apply to migrate as Secondary Applicants. The quota of 250 applies to the total of Primary and Secondary Applicants and corresponds to about 90 migrant households each year. Data supplied by the New Zealand Department of Labour for residence decisions made between November 2002 and October 2004 reveals that only four applications were rejected for failure to meet the requirements of the policy.

Zealand consular offices, so there should be no expectation of either impropriety or non-randomness amongst ballot applicants. During the 2002-05 ballot years from which our sample is drawn, the odds of having one's name drawn were approximately one in ten.

Once their ballot is selected, applicants then apply for permanent residence in New Zealand and have six months to obtain a job offer in New Zealand that meets an income threshold similar to the adult minimum wage. This is to ensure financial self-reliance since Tongan migrants are not eligible for most forms of welfare until they have resided in New Zealand for two years. Prior to 2004, PAC applicants were left to their own devices to find these jobs, with most using family networks in New Zealand to obtain retail and construction jobs (Gibson and McKenzie, 2007). Since 2004, the New Zealand immigration authorities have also arranged recruiting visits by employers seeking PAC ballot winners to work as bus drivers, prison guards and so forth.

2.3 Survey Data

The data used in this paper are from the Pacific Island-New Zealand Migration Survey (PINZMS), a comprehensive survey designed to measure multiple effects of migration, taking advantage of the natural experiment provided by the PAC.[6] The survey design and enumeration, which was overseen by the authors in 2005-06, covered random samples of four groups of households, surveying in both New Zealand and Tonga.

The first group is a random sample of 102 of the 302 Tongan immigrant households in New Zealand, who had a member who was a successful participant in the 2002-2005 PAC ballots.[7] Administrative data show that none of the ballot winners had returned to live in Tonga

[6] See www.pacificmigration.ac.nz for more details of the survey.
[7] A large group of the immigrant households were unavailable for us to survey because they had been reserved for selection into the sample of the Longitudinal Immigrant Survey, conducted by Statistics New Zealand. In McKenzie

for up to two years after the time of the survey. The second group consists of a sample of households of successful participants from the same random ballots who were still in Tonga at the time of surveying. These households are therefore non-compliers to the treatment of migration. We sampled 29 of the 65 households in this group, focusing our sampling on households located in villages from which the migrants in our first survey group had emigrated.

The third survey group consists of households containing unsuccessful participants in these same ballots, who form an experimental control group. The full list of unsuccessful ballots from these years was provided to us by the New Zealand Department of Labour, but the contact details only included a post office box address. We used two strategies to derive a sample of 120 households from this list, with this sample size again dictated by our available budget. First, we used information on the villages where migrants had come from to draw a sample of unsuccessful ballots from the same villages (implicitly using the village of residence as a stratifying variable). Second, we used the Tongan telephone directory to find contact details for people on the list. To overcome concerns that this would bias the sample to the main island of Tongatapu, where people are more likely to have telephones, we deliberately surveyed households from smaller outlying islands.

The final survey group consists of households living in the same villages as the PAC applicants but from which no eligible individuals had applied for the quota in any of our sample years (e.g. 2002-2005). We randomly selected 90 non-applicant households that met the condition of having at least one member aged 18 to 45 (so as to restrict attention to non-applicant

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et al. (2010), we describe in detail the tracking of the sample in New Zealand, showing a contact rate of over 70 percent. The main reasons for non-contact were incomplete name and address details, which should be independent of labor market outcomes and expectations and therefore not a source of sample selectivity bias. There was only one refusal to take part in the survey in New Zealand and none in Tonga. The robustness analysis we conduct in the paper for non-compliers being different can equally be considered a robustness check to show our results would continue to hold even if those we couldn't locate were dramatically different from those we interview.

households who could have had an age-eligible member apply to the PAC if they had been interested in so doing).

While the survey obtains labor market information from all adults, the detailed questions on expectations are directed only at the Principal Applicants or at a randomly selected adult aged 18-45 in the non-applicant households. It is this sample of Principal Applicants and the non-applicant adults who answered the expectations questions that are the focus of this paper.

The use of the ballot lottery to determine which principal applicants are eligible to migrate offers two advantages from the point of view of assessing expectations. First, it enables assessment of the accuracy of expectations from a cross-sectional sample, which is the most typically used type of survey in migration research. Second, while a before-after comparison that contrasts pre-migration expectations of migrants to their realized incomes would be interesting, there are three problems with doing this with international migration.

The first, and most easily corrected, is that to date we do not know of other surveys of migrants and potential migrants which ask these expectations questions. The second, and most severe issue, is the challenge and cost of being able to identify individuals likely to migrate in advance of them migrating, and then tracking them across international borders. In many cases that try to do this, attrition rates are very high.[8] A third issue is that even if one were able to obtain expectations from individuals before migrating and then follow them to determine their realized employment and income status, this only enables measurement of the accuracy of expectations if there are no aggregate shocks - whereas we can assess accuracy even in the presence of aggregate shocks since we measure the expectations of potential migrants (ballot

[8] As an example, Beauchemin and Gonzalez-Ferrer (2011) report only being able to interview 6 percent of the migrants that Senegalese households said they had abroad. On the other hand, the Mexican Family Life Survey managed to track 91 percent of migrants who moved to the US between 2002 and 2005, but only 217 of the 8,116 men aged 21 to 65 interviewed at baseline were in the US three years later.

losers) and compare them to the realizations of income for similar migrants (ballot winners) at the same point in time. Nonetheless, if one were to re-interview migrants a short time after migration these aggregate shocks may not be that important, and it would be very interesting for future studies to do so and compare at the individual level expectations to realizations of employment and earnings.

Table 1 reports selected characteristics of the different applicant groups. The average migrant applicant in our sample is 34 years old, has 12 years of education, is married, and earned 100-140 pa'anga per week in Tonga prior to migration (approximately US$50-70). Male and female principal applicants have similar levels of education, and if anything, females earn slightly more in Tonga than males.

Randomization under the ballot lottery ensures that the ballot winners as a group are comparable to the ballot losers. This appears to hold reasonably well in sample, with no significant difference in age, income earned in Tonga, or marital status, although the ballot winners have slightly higher education. Our results continue to hold conditional on education. Non-compliers have slightly higher income, but lower education than ballot winners who move. Below, we examine the sensitivity of our results to different bounds on the incomes that these non-compliers would have earned had they migrated.

A potential threat to the randomization provided by the PAC ballot is that people can re-apply if they are unsuccessful and if multiple entrants differ from other ballot entrants, a form of selection bias may still occur. In theory, this problem is easy to fix provided one has data on which lotteries were entered – whether or not someone wins the lottery would be random conditional on which lotteries they entered. An example of this approach is provided by Abdulkadiroglu et al. (2011) for charter school lotteries. But the PINZMS questionnaire only

asked about the number of years with ballot entries between 2002 and 2005, not which years people entered.

Nevertheless, 93 percent of the migrants applied only once and won on their first attempt, so it is not the case that the migrant sample contains a lot of individuals who persist in applying year after year. Furthermore, among the ballot losers, we do not find a significant difference in either the expected likelihood of being employed in New Zealand or the incomes to be earned conditional on being employed for those who have applied only once versus those who have applied multiple times. Given this, it seems unlikely that multiple entries are inducing significant bias in our estimation.

The final point to note from Table 1 is that the mean number of years in New Zealand is just under 1 for the migrants, with 82 percent of the migrants in New Zealand for 18 months or less. Our data therefore give the initial incomes and employment patterns for Tongan migrants, not what they would earn after time to assimilate in the New Zealand labor market and gain more skills and education.

3. Measuring Expectations

We elicited probabilistic expectations about employment and income in New Zealand from the sample of PAC ballot losers in Tonga. We will compare these expectations to the realized employment and income outcomes of the ballot winners, who had emigrated to New Zealand. We also reversed the procedure by eliciting probabilistic expectations about employment and income in Tonga from the immigrants in New Zealand.

3.1 Survey Questions

We follow the approach pioneered by Dominitz and Manski (1997) in measuring expectations. Expectations about employment in New Zealand were obtained by first explaining the concept of probabilities and then asking the following question in our survey in Tonga:

> "I would now like you to think about what you would be doing right now if you were living in New Zealand. What do you think is the percent chance that you would be working for pay?"

Our field experience suggests that respondents interpreted this question as pertaining to a situation in which they had been successful in the PAC ballot, in which case they would have been living in New Zealand for the same (short) duration as our migrant sample.[9] If potential migrants interpreted this with regard to their expected situation after several years of living in New Zealand, we would expect them to overstate incomes relative to the realized incomes of the migrant group. As will be seen, we observe the opposite.

All individuals who expressed a percent chance greater than zero of working for pay were then asked what they thought were the lowest weekly amount and highest weekly amount that they could possibly be earning in New Zealand if they were working for pay in New Zealand right now.[10] As Dominitz and Manski (1997) note, these questions serve to decrease overconfidence problems in which respondents tend to focus too much on central tendencies and not consider the uncertainty in potential outcomes. They also act to decrease anchoring problems whereby respondents' beliefs are influenced by the amounts that the interviewer asks about.

[9] It would also be of interest in future work for surveys to ask expectations of what the average migrant would earn, to be able to distinguish between pessimism towards own prospects versus pessimism towards the prospects of migrants in general.

[10] In future work, it would be good for researchers to also ask expectations about the type of occupation migrants expect to work in, as well as how much they expect to earn, to see whether migrants end up working in jobs lower on the occupational ladder than they expect. An extreme version of this is migrant trafficking, where migrants believe they are coming for one higher paying occupation, and end up in more dangerous and lower paying occupations (Mahmoud and Trebesch, 2010).

Nevertheless, they should not be interpreted as literal maxima and minima – Delavande et al. (2011) show that they should be better understood as relatively high and relatively low unspecified quantiles of the expected distribution.

The average of the answers to the highest and lowest weekly incomes were then used by the interviewer to read a set of threshold levels of income, *Y1*, *Y2*, *Y3*, and *Y4*, from a predetermined table on the questionnaire. Respondents were then asked:

> "Thinking about the income that you would be earning if you were working in New Zealand right now, what do you think is the percent chance that your own weekly income from work would be less than *Y1* New Zealand dollars?"

The same question was then asked for thresholds of *Y2*, *Y3* and *Y4* dollars. For example, an individual whose average of the highest and lowest weekly incomes was $375 would be asked what the percent chance was that their income would be less than $300, $350, $400 and $450. The Tongans in our sample have good knowledge of the New Zealand-Tonga exchange rate, with McKenzie (2007) showing that on average they get the exchange rate correct at the rate money transfer operators charge.[11]

3.2 Comparison with Other Approaches

Very few surveys of migrants ask questions about expectations. It is therefore worth discussing the rationale for adopting the probabilistic questions used here in lieu of some of the more traditional qualitative and attitudinal questions. For employment, instead of asking the percent chance of being employed, a traditional approach could involve asking a question such

[11] In some contexts one might also be concerned that potential migrants do not understand the large differences in cost of living between home and the destination country. This seems less of a concern in our case – although Tonga did not participate in the International Price Comparison project, our own attempt to compare prices in New Zealand and Tonga in McKenzie et al. (2010) finds the PPP exchange rate to be similar to the prevailing actual exchange rate during the period of our survey.

as “what do you think your likelihood of being employed would be if you were living in New Zealand right now: very likely, likely, unlikely, highly unlikely”. As Dominitz and Manski (1997) and Manski (2004) note, such a question would have at least two drawbacks over the probabilistic question. The first is that it makes it very difficult to compare responses across individuals, since each individual can interpret terms such as “very likely” differently. Secondly, the coarseness of the response limits how much information can be obtained from such a question.

A more direct question with income would be to ask would-be emigrants how much they would expect to be paid if they were working in New Zealand. A variant of this is used in the New Immigrant Survey, which asks immigrants to state how much they think workers usually earn in various jobs in the United States. However, as Dominitz (1998) points out, it is not clear if individuals are reporting means, medians, modes, or some other quantiles of their subjective distributions when they respond to such questions. In contrast, by eliciting probabilities, we can estimate all quantiles and moments of interest from the subjective earnings distribution. Secondly, what matters is not so much whether immigrants have accurate information about incomes in particular jobs which may or may not be relevant for them, but whether they have accurate information about the range of incomes they are likely to earn.

3.3. Fitting the Subjective Earnings Distribution

We summarize briefly here the procedure for estimating the subjective distribution of earnings conditional on working. We follow closely the approach of Dominitz and Manski (1997), where further details are provided.

The four responses about percent chances for the income threshold questions are divided by 100 and then interpreted as points on the subjective cumulative distribution function (CDF) of

weekly labor income if they were working in New Zealand. Thus for each individual *i*, we observe

$$F_{i,k} = P(y_i < Y_{i,k}|z=1, \varphi_i) \; k=1,2,3,4$$

where y_i denotes earnings in New Zealand, $Y_{i,1}$, $Y_{i,2}$, $Y_{i,3}$ and $Y_{i,4}$ are the earnings thresholds that *i* is asked about, φ_i is *i*'s information set, and z=1 denotes that the expectations are conditional on working in New Zealand. Let $G(Y; \mu, \sigma^2)$ denote the CDF of a log-normal distribution, where $\log Y \sim N(\mu, \sigma^2)$. For each respondent, we then find estimates μ_i, σ_i^2 to solve the least squares problem[12]:

$$\min_{\mu,\sigma^2} \sum_{k=1}^{4} \left(F_{i,k} - G\left(Y_{i,k}; \mu, \sigma^2\right)\right)^2$$

Once a distribution has been fitted for each respondent, we can then obtain moments and quantiles of interest from the fitted distribution. We extract the mean, standard deviation, median and selected percentiles from the fitted distribution. The log-normal distribution fits the elicited points very closely. One measure of the goodness of fit is the mean absolute difference between the elicited and fitted distributions. This average difference is 0.015, and 115 out of the 119 observations have mean absolute errors below 0.05.[13] These fits are closer than those achieved by Dominitz and Manski (1997) with one year ahead labor income in the United States.

Figure 1 provides an illustration of the elicited and fitted distributions for four of our 119 ballot loser respondents. Respondent 1 reported a lowest possible income in New Zealand of $100 and highest possible income of $300. This led to them being asked about the thresholds {150, 200, 250, 300}, for which they gave the sequence of probabilities {0.6, 0.7, 0.75, 0.8}. The

[12] Note that if at least three of the four elicited probabilities take the value of zero or one, then the solution is a degenerate log-normal distribution. None of our respondents fell into this category, and so the least squares problem is well-formulated, with a unique non-degenerate solution for each individual.

[13] One of the 120 ballot loser principal applicants surveyed did not answer the expectations questions.

upper left panel shows all four points lie very close to the fitted CDF, with a mean absolute difference between the elicited and fitted distributions of 0.003. The estimated median is $110 and estimated mean is $224. The estimated 75th percentile of the distribution is $246, which accords well with the elicited probability of 0.75 of having income less than $250.

The CDF of respondent 30 (lower left panel) illustrates a close fit, even when all the elicited probabilities are of 0.8 or higher. Here the lowest and highest incomes were given as $100 and $400, and we estimate a median of $130 and mean of $149. Such cases show that the midpoint of the highest and lowest values can be a misleading estimate of the average. The CDFs of respondents 3 and 64 (upper and lower right panels) show examples of less accurate fits (mean absolute differences of 0.043 and 0.032). However, even in these cases the fit is quite close, suggesting the log-normal distribution is an appropriate approximation to the subjective CDF.

4. Employment Expectations

Figure 2 shows the histogram of responses to the percent chance of being employed in New Zealand as expressed by the PAC ballot losers in Tonga. The actual employment rate in New Zealand at the time of our survey for the PAC migrants was 81.2 percent. It is immediately clear from this figure that potential emigrants are underestimating the likelihood of being employed, as 79 percent give a percent chance less than 80 percent, and 96.6 percent a percent chance of being employed of less than 81 percent.[14] The other notable feature of Figure 2 is that we see a range of responses, and not the clustering of responses at 0, 50 and 100 which have been interpreted in other contexts to indicate a lack of understanding of expectations (see Delavande et al, 2011).

[14] Among migrants in New Zealand for six months or less the employment rate is 76 percent, hence issues around the timing of the realisations versus the expectations does not explain the understatement.

Table 2 explores this further by presenting the mean and quantiles of this distribution. The mean percent chance of being employed expected by potential emigrants is 55.5 percent. This is lower than both the 71.7 percent employment rate that they currently have in Tonga, and lower than the 81.2 percent employment rate of the PAC immigrants in New Zealand.

When we break the data down by gender, we see that the underestimation seems to be coming only from males. Both males and females express an average percent chance of being employed in New Zealand of 55 percent, however amongst our sample of PAC ballot winners in New Zealand, males have a 90.5 percent employment rate and females a 60.5 percent rate. The confidence interval for the male expected rate lies entirely below the actual rate experienced by migrants, whereas the female rate lies within the confidence interval and is close to the true rate.[15]

This simple comparison of ballot losers to the realizations of migrants assumes that non-compliance is random. However, this underestimation for males continues to hold even if there is extreme self-selection in terms of which ballot winners immigrate. The bottom of Table 2 constructs bounds for the actual employment rate of ballot winners under different assumptions about the employment rates non-compliers would have. Even if all the non-compliers were unemployed in New Zealand, the male employment rate would still be 75 percent, 20 percentage points higher than the mean expected rate for males. A less conservative lower bound for the employment rate of ballot winners assumes only 25 percent of non-compliers would find jobs, less than one-third the rate of migrants. This would raise the male employment rate to 79 percent.

[15] There is little difference in the expectation of being employed between ballot losers who have applied only once and those who have applied multiple times to the PAC. Among males, the mean percent chance of being employed is 57 percent for those who have applied once versus 54 percent for those who have applied more than once; for females it is 57 percent for those who have applied once versus 53 percent for those who have applied multiple times. Neither difference is statistically significance.

In contrast, the mean expected employment rate among females is between these two scenarios, again suggesting accurate expectations for females.

5. Income Expectations

5.1 Earnings Conditional on Working

The first row of Table 3 presents the mean, standard deviation, and selected quantiles from the weekly wage distribution of PAC immigrants working in New Zealand, and the second and third rows break this down by gender. The remainder of the table details the expectations of ballot losers, first for the pooled sample, and then broken down by gender.

The first rows of the expectations report the lowest and highest income amounts that PAC ballot losers say they would be earning if currently working in New Zealand. For the males, even the highest amount (NZ$506) is lower than the mean actual work income of NZ$558 actually earned by the migrants in New Zealand. In contrast, for females the mean actual income earned (NZ$442) lies almost midway between the mean lowest amount of NZ$260 and the mean highest amount of NZ$654 expected by the ballot losers.

The remainder of Table 3 then presents the mean and different quantiles of the estimated conditional earnings distribution for each individual. The means of the mean and median expected weekly earnings in New Zealand are $377 and $329. Comparing these to the mean ($522) and median ($480) of the actual distribution of wages, we see that both are only 70 percent of the actual earnings. This underestimation is entirely driven by males. The mean of the mean expected earnings in New Zealand for males is $339, which is only 60 percent of the mean realized earnings of $NZ558 for the migrants. This large underestimation for males occurs across the whole distribution, but appears proportionately larger at the bottom of the distribution. The

mean 10th percentile of expected earnings is only 41 percent of the 10th percentile of actual earnings, and the mean 90th percentile of expected earnings is 80 percent of the 90th percentile of actual earnings. That is, there does not appear to be overestimation of potential earnings, even at the top of the distribution.

In contrast, expectations of female ballot losers are fairly close to the actual realizations. The mean of the mean earnings expected by females conditional on working is $422, compared to a realized mean of $442. The mean of the expected median is within 10 percent of the realized median. Expectations are also closer to the realized quantiles at the tails than for males – the mean 10 percentile of expected earnings is NZ$230, compared to a 10th percentile of realized earnings of 300.

This underestimation of conditional earnings of males is robust to potential self-selection into migration among ballot winners. Even if the non-compliers all earned only $1 if they worked, mean realized income for male ballot winners would still be $463, 37 percent higher than the mean of the mean expected conditional earnings. The average migrant in our data has been in New Zealand for slightly less than one year. Mean earnings for males are $498 if we restrict only to individuals who have been in New Zealand for six months or less (rather than $558 over all durations), which is still substantially higher than expected earnings. The underestimation is therefore also not due to the migrants reporting incomes after having assimilated in New Zealand and the ballot losers giving expectations about prospects in the first year after migration.

5.2 Unconditional Earnings

The unconditional distribution of expected earnings can then be obtained by combining the conditional earnings distribution with data on the expected probability of being employed. Since the income from work is zero if the individual is not working, we have for work income *y*:

$$P(y_i \mid \varphi_i) = P(y_i \mid z_i = 1, \varphi_i)\, P(z_i = 1)$$

where $z_i = 1$ indicates that individual *i* is employed in New Zealand and φ_i is *i's* information set. Combining the elicited expectations about the probability of employment given in Table 2 with the conditional earnings distributions in Table 3 we obtain the unconditional earnings distributions.

Table 4 reports the actual unconditional earnings distribution of immigrants in New Zealand and compares this to the means of the expected unconditional distribution. Not surprisingly given that they underestimate both the probability of being employed and the income they would earn if employed, we find males to underestimate unconditional income. The mean of the mean expected earnings for males is NZ$188 per week, only 37 percent of the actual mean of NZ$504. This large underestimation of earnings holds even if the non-compliers were all to earn zero in New Zealand – then the mean realized income would be NZ$415, still 2.2 times the mean expected earnings. In contrast, the mean expected earnings for females is NZ$244, which is much closer to the NZ$291 realized mean of migrants, and above the lower bound of NZ$239 obtained by assuming that non-compliers would earn zero income.

5.3 Do Expectations Help Predict Actual Decisions?

The importance of the finding that male potential emigrants underestimate incomes to be earned abroad depends in part on whether or not these expectations play a role in the decision to migrate. Classic theories of migration, such as Sjaastad (1962) and Harris and Todaro (1970)

predict that expectations of incomes and employment abroad should matter. To examine whether expectations help predict actual decisions in our data, we compare the unconditional income expectations of ballot losers to the expectations of non-applicants in the same villages as the PAC ballot applicants.

Column 1 of Table 5 pools men and women, and shows that the mean expected income is positively and significantly associated with the decision to apply for the Pacific Access Category, even after conditioning on pre-application income and employment status in Tonga, on age, and on the total number of types of relatives they have in New Zealand (total network) and the number of uncles, aunts and cousins (extended family). We also see a positive and significant coefficient on income earned in Tonga, which is consistent with the positive self-selection into applying for the PAC found in McKenzie et al, (2010). Columns 2 and 3 show that expected income also helps predict applications in the male and female sub-samples respectively, although this is stronger and more significant for the female sample, with a p-value of 0.114 for the male sample. The magnitude of the effect is quite large, expecting NZ$100 more income per week after migrating is associated with a 9-14 percentage point increase in the likelihood of applying.[16] Hence, there is evidence consistent with these expectations predicting economic behavior.

We note these results should be considered as suggestive only, since we do not have an independent source of variation in migrant expectations, and differences in expectations may therefore simply be proxying for other unobserved characteristics of individuals which are

[16] One might be concerned that since we measure expectations after application, that the ballot losers have acquired information about incomes in New Zealand in the process of applying. While we cannot rule this out, we do not think it is likely. First, we have seen that the male sample of ballot losers has very inaccurate expectations about earnings in New Zealand. Second, only 5 percent of PAC ballot applicants have a job offer in New Zealand at the time of applying for the ballot lottery, with the vast majority waiting until their name is drawn to seek a job offer (and thereby learning about earnings in New Zealand).

correlated with both the decision to apply and with expectations. To prove this causally, one would ideally carry out a randomized information intervention similar to Jensen (2009) to induce independent variation in what similar individuals think employment opportunities abroad are like. Ongoing experimental work in the Philippines is attempting to test whether providing accurate information about the incomes to be earned abroad induces more people to try and emigrate.[17]

6. What Explains the Underestimation of Income by Males?

The above results show that there is no evidence that potential migrants overestimate their employment prospects and earnings in New Zealand. Instead, we find that females have reasonably accurate expectations, whereas males dramatically underestimate how much they can earn. We now explore several explanations for these results.

6.1 Do Males Have Poor Expectations in General?

A first explanation for the underestimation by males of employment and income possibilities in New Zealand is that the questions were either not well understood by the survey participants, or that male participants are poor in forming expectations even about events for which they have more direct experience. Given that males and females have similar education levels, it is not clear why a gender difference in understanding or in expressing probabilistic expectations should arise. However, to check this possibility we asked immigrants in New Zealand analogous questions as to their percent chance of being employed and the income earned if they were working in Tonga. Since all are recent emigrants from Tonga, and most were working there, one should expect them to have reasonably accurate expectations.

[17] The ongoing work is a project being carried out by Emily Beam, David McKenzie and Dean Yang (http://www.poverty-action.org/project/0173).

Table 6 compares these expectations of the male immigrants in New Zealand about work in Tonga to their own previous experiences and to the experiences of the group of male PAC ballot losers. The results provide sharp evidence against the hypothesis that the males in our sample are not able to understand expectations questions or that they just have poor expectations in general. The mean percent chance of working in Tonga is 66.7 among the migrants, which is almost exactly equal to the actual employment rate of male ballot losers in Tonga of 66.2 percent. The mean conditional expected earnings of 192 pa'anga are very close to the 187 pa'anga mean conditional earnings realized in Tonga among ballot losers. Thus, males give very accurate expectations answers when asked about a situation to which they have prior experience.

6.2 Very Lucky Immigrants?

A second explanation for the difference between subjective expectations and the realized outcomes of male immigrants is that the male immigrants all happened to receive very high draws from their subjective earnings distributions. To see how lucky male immigrants would have had to have been for this to explain the difference, we draw an income from the estimated subjective conditional earnings distributions for each would-be male emigrant, and use this to construct an estimate of the mean expected earnings among the would-be emigrants. We do this 10,000 times.

In only 5 out of these 10,000 draws do we obtain a subjective mean equal to or greater than the actual mean conditional income for male immigrants of $558. Moreover, we get a subjective mean no more than 10 percent below the actual mean in only 16 out of the 10,000 draws, and a subjective mean no more than 20 percent below the actual mean in only 117 out of the 10,000 draws. Therefore, it appears extremely unlikely that the large gap between expected

and actual earnings for males can be attributed to the male immigrants all receiving very good draws from their subjective earnings distributions.[18]

6.3 Psychological Effects of Losing the Ballot Draw?

We asked the expectations questions at a time when individuals already knew whether or not their name had been drawn in the ballot. A third possibility for the understated expectations of males is that ballot losers attempt to make themselves feel better about losing in the ballot by downplaying the employment and income possibilities abroad. It is not clear why this would be true of males and not females, and the fact that individuals can apply again for the PAC ballot the next year should reduce such an effect.

Further evidence against this channel comes from a small sample of 8 individuals from whom we obtained expectation information while they were in Tonga, and then later re-interviewed in New Zealand as migrants. There were 7 males in this group, and for each, the mean of their conditional earnings distribution (NZ$255) was substantially less than what they actually earned in New Zealand (NZ$675). Thus, even for a group in the process of moving, for whom any psychological effects should be less severe, we find males substantially underestimating the income they can earn in New Zealand.

6.4 Old Information?

Our survey allows us to compare the expectations of PAC ballot losers to the realized outcomes of PAC ballot winners at the same point in time. However, although we have complete information on how PAC ballot winners fare in New Zealand, it appears unlikely that individuals

[18] Of course these calculations assume that draws from the subjective distributions are independent across individuals. In practice, all individuals could receive a common positive shock. However, consider the very extreme case of perfectly correlated draws, so that if one individual draws from the 95th percentile of his or her subjective distribution, all other would-be emigrants also draw from this percentile of their distributions. Even in this extreme case, the probability of getting a mean subjective income of $558 or higher is only 0.13.

in Tonga do. A fourth potential explanation for the understated employment probabilities and expected income for males is therefore that it arises from forming expectations on the basis of information coming from earlier cohorts of migrants, who are the wrong reference group.

Potential migrants may base their expectations on the experiences of earlier cohorts of Tongans migrating to New Zealand. At the time of the survey, unemployment rates for Pacific Islanders in New Zealand had fallen sharply over a 10-year period, with the male unemployment rate falling from 15.2% in 1996 to 6.8% in 2005. Using the New Zealand Income Survey, we can look more closely at recent Tongan migrants in New Zealand (e.g. individuals who have lived in New Zealand for five or less years). Averaging over 1997-99, the percentage of male 20-46 year-olds employed was 64%, rising to 71% over 2001-03. On the other hand, the percentage of female 20-46 year-olds employed was 38% in the earlier period and 36% in the later period.

As PAC migrants are economic migrants coming with job offers, they have much higher employment rates than other Tongan migrants, who mostly come in through family reunification categories. Thus, the mean percent chance expected of employment for male migrants to New Zealand of 55 percent is still way too low even if based on the experiences of earlier migrants

Pay increases for wage workers in Tonga are relatively rare, with public sector workers not receiving any pay increases between 1996 and 2005. Thus, basing income expectations on experiences several years ago is quite accurate in Tonga, and potential migrants may expect the same to apply in New Zealand. Mean (median) wage incomes conditional on working for recent male Tongan migrants aged 20-46, expressed in 2004 New Zealand dollars, average $388 ($381) over 1997-99, and $564 ($530) over 2001-03. The mean mean and mean median expected wage incomes for men of $339 and $290 are thus 87% (76%) of the 1997-99 mean (median). On the other hand, the mean (median) wage incomes conditional on working for recent female Tongan

migrants aged 20-46 average $430 ($390) over 1997-99, and $409 ($411) over 2001-03, while the mean mean and mean median expected wage incomes for women were $421 and $375, respectively.

So it is possible that the reason why male potential migrants have low expectations of incomes is that they are basing their experiences on average migrants migrating almost ten years before them. Expectations for females are also consistent with using old information, however they are also consistent with the outcomes for more recent female migrants since earnings have not increased appreciably for female Tongans in New Zealand between the late 1990s and early 2000s.

While this is a possible explanation for our findings, these results then raise the question as to why potential migrants from a country with very large migrant networks do not have more recent labor market information. Return migration of PAC migrants is extremely rare in the short-run, and so returning migrants from older cohorts may be the main source of day-to-day information about conditions for new migrants in New Zealand.

6.5 The Role of Extended Family

The Tongan-born population in New Zealand was 17,682 by the time of the 2001 Census, compared to a population in Tonga of just over 100,000. As a result, many Tongans know someone in New Zealand, who may be a source of information about job opportunities. Those applying to move to New Zealand under the PAC have more relatives in New Zealand than those not applying (McKenzie, Gibson and Stillman, 2010). Among our sample of PAC ballot losers, 61 percent have a parent or parent-in-law in New Zealand, 80 percent have a sibling or sibling-in-law, 55 percent have an aunt or uncle, and 55 percent have a cousin.

The migration literature has stressed the positive role that networks have on the ability of migrants to overcome credit constraints that restrict the initial migration decision (McKenzie and Rapoport, 2010), and on helping migrants find jobs once they arrive (Munshi, 2003). Such work suggests networks also play an important role in providing some information about living conditions abroad to their network members. However, less is known about the accuracy of the information provided. Recent work among Indian migrants to Canada (Somerville, 2011) has found that the narratives these migrants receive and subsequently impart to others are often inaccurate, which can lead to miscommunication flows among these migrant networks. Even within a household, Chen (2006) stresses the imperfect nature of monitoring work behavior from far away. . As a result, it will not necessarily be the case that a large network will result in an accurate information flow.

Extended family such as uncles, aunts and cousins are an important source of remittances, with 43 percent of all remittances coming from extended family (McKenzie, 2007). However, the remittance demands from extended family are seen by many as a burden on migrants. Based on her study of Tongan migrants in Australia, anthropologist Helen Lee writes that

"these young people often argue that it is important to meet the needs of the immediate family before others, and while they uphold the importance of respect and of ties to the extended family, many believe that obligations to extended family create unwarranted demands on families already struggling to make ends meet".

Lee (2003, p155)

One mechanism that immigrants might use to try to mitigate the pressure to remit to extended family, or to at least reduce the level of remittances sought, might be to claim that they are earning less than they actually are, or not share information on earnings with extended family. If this is the case, conditional on the total immigrant network that potential emigrants

have in New Zealand, we should expect them to have lower income expectations if this network includes extended family.

Table 7 explores this hypothesis by regressing the mean expected earnings conditional on working on usual wage equation variables (age, sex, years of education), usual wage income in Tonga, which should proxy for other labor market attributes, the total immigrant network, measured as the number of different types of relatives an individual has in New Zealand, and a dummy for whether they have extended family in New Zealand.[19] Columns 2 and 3 then do this separately by gender. We see that having a larger network in New Zealand leads potential migrants to expect higher incomes, but conditional on the size of the network, having extended family in its composition lowers expected earnings. This is particularly true for men.

In contrast, columns 4 to 6 show little association between any observable characteristics and employment expectations. The employment status of migrants is likely to be something more easily verifiable than earnings (other community members abroad will likely observe whether or not a migrant is working, but not their income). Thus, if extended family are trying to moderate remittance demands, it seems plausible that they would be able to do so more readily through less accurate information on income earned, than through misreporting their employment status.

These results thus show that having extended family in New Zealand lowers expected earnings, conditional on total family network size. This might be entirely rational if extended family members are less useful than immediate family members in helping new immigrants find good jobs in New Zealand. In the last two columns of Table 7, we therefore look at the degree of understatement of income, using the sample of migrants in New Zealand to predict actual income as a function of the regression covariates, and then defining underestimation as this predicted

[19] Our survey did not collect how many of each type of relative the individual had in New Zealand. Thus we know, for example, that they had a cousin in New Zealand, but not how many cousins.

income less mean expected income. We see here that males with extended family in New Zealand underestimate income by NZ$193 if they have extended family, whereas the effect for females is only NZ$43 and insignificant. Recall that in Table 3 the difference between actual mean conditional earnings for males and mean expected earnings, conditional on working, was NZ$219. Thus, the association with extended family almost entirely accounts for the underestimation.

Why is the role of the extended family different for men than women in determining expectations? Two possible explanations come to mind. The first is that it could be the case that male migrants just talk less to their extended family than female migrants do, so that less information about male migrants filters back. Our surveys do provide direct evidence that the flow of information about income is much weaker to extended family members. For each type of relative, migrants were asked whether this type of relative in Tonga knew their income in New Zealand. Migrants reported that 37 percent of parents knew as well as 17 percent of siblings, but only 4 percent of cousins, and 2 percent of uncles and aunts. However, this was similar for male and female migrants, suggesting that while communication is limited, it is not differentially so for males.

Nevertheless, traditional Tongan society accords higher status within families to sisters over brothers, and places the oldest sister at the head of the extended family grouping. She then traditionally has authority over others within the kin group, including the right to demand goods and services from her brothers, maternal uncles, and other kin (Emberson-Bain, 1998). Moreover, traditional production systems in Tonga were gendered, with male production of starchy foods and female production of soft textile wealth (fine mats and tapa cloth). This textile wealth remains central to modern exchange ceremonies, which span country borders and have

cash and tapa intermingling (Horan, 2002). Hence, from their key position within tapa production and exchange networks, women may be in a more informed position than men with regard to extended family finances. Given this institutional context, it may be that women receive more information about finances within the family.

6.6 No Male Wage Premium in Tonga?

A second explanation for this gender difference is that males have a lot more scope to underestimate, since the gain in income from migrating is much greater for them. Tables 3 and 4 show much bigger gender differences in realized conditional and unconditional incomes for migrants than the gender difference in expected incomes. Essentially male and female migrants expect similar amounts in New Zealand, and the surprise or news is that the males then earn a lot more.

Table 8 examines the gender difference in work income in Tonga and in New Zealand, controlling for years of education, age and marital status. Column 1 uses the PAC ballot losers, and shows that women actually earn, on average, more than men in Tonga, although not significantly so. Column 2 shows this insignificant gender difference continues to hold in a larger and broader sample of the Tongan labor force. That is, there is no male wage premium in Tonga. In contrast, columns 3 and 4 show a large male wage premium for Tongans working in New Zealand, both amongst PAC principal applicants in our survey, and for the broader sample of all Pacific Island migrants in New Zealand. The male wage premium of NZ$122-34 per week explains over half of the underestimation of males relative to females.

The male wage premium for Tongan immigrants in New Zealand appears to occur because of differences in occupations among male and female migrants. Typical jobs for the male immigrant workers in our survey include builder, welder, construction worker, carpenter,

technician, and factory worker. Typical jobs for female immigrants include cleaner, sales assistant, and grocery packer. In contrast, although some immigrants worked in similar positions in Tonga, both men and women also worked in more white-collar jobs, such as teaching, banking services, and as government employees. What is not clear is why knowledge of this gender gap has not passed back to males in Tonga.

7. Conclusions

We have combined a natural experiment on emigration with survey data on would-be emigrants expectations about employment and incomes in the migration destination. Contrary to anecdotal stories which raise fears of over-optimistic expectations, we find striking evidence that male emigrants tend to underestimate the employment likelihood and the income they can earn abroad, while female emigrants have reasonably accurate expectations. The degree of underestimation for males appears to be in due to changes in the male wage premium between Tonga and New Zealand, to recent income growth and better employment prospects for males in New Zealand compared to several years earlier, and to extended family not passing on accurate information about wages. Given that higher expected earnings are associated with a higher likelihood of applying to migrate, the results suggest that more accurate information about earnings opportunities abroad may actually increase migration pressure.

More broadly, our work demonstrates the feasibility of asking probabilistic expectations questions to individuals in developing countries, even in cases in which the event for which expectations are elicited is not one for which the individual has direct prior experience. Since individual decisions are driven by their subjective expectations, the large gap we find between

realized outcomes for immigrants and expected outcomes for comparable would-be emigrants suggests that inference based on realized outcomes alone may be very misleading.

References

Abdulkadiroglu, Atila, Joshua Angrist, Susan Dynarski, Thomas Kane and Parag Pathak. (2011). "Accountability and Flexibility in Public Schools: Evidence from Boston's Charters and Pilots." *Quarterly Journal of Economics* 126(2): 699-748.

Attanasio, Orazio. (2009). "Expectations and perceptions in developing countries: their measurement and their use", *American Economic Review Papers and Proceedings* 99 (2): 87–92.

Attanasio, Orazio, and Katja Kaufmann (2009) "Educational choices, subjective expectations, and credit constraints". NBER Working Paper No. 15087

Beauchemin, Cris and Amparo González-Ferrer (2011) "Sampling international migrants with origin-based snowballing method: New evidence on biases and limitations", *Demographic Research* 25(3): 103-34.

Braga, Michaela (2010) "Dreaming another life: The role of foreign media in migration decision. Evidence from Albania", https://cream.conference-services.net/resources/952/2371/pdf/MECSC2011_0396_paper.pdf

Chen, Joyce (2006) "Migration and imperfect monitoring: implications for intra-household allocation", *American Economic Review* 96(2): 227-31.

Delavande, Adeline and Hans-Peter Kohler (2009) "Subjective expectations in the context of HIV/AIDS in Malawi.", *Demographic Research* 20 (31), 817–874.

Delavande, Adeline, Xavier Gine and David McKenzie (2011) "Measuring subjective expectations in developing countries: a critical review and new evidence", *Journal of Development Economics*, 94(2): 151-63.

Dominitz, Jeff (1998) "Earnings Expectations, Revisions, and Realizations", *Review of Economics and Statistics* 80(3): 374-88.

Dominitz, Jeff and Charles Manski (1997) "Using Expectations Data to Study Subjective Income Expectations", *Journal of the American Statistical Association* 92(439): 855-67.

Emberson-Bain, `Atu `o Hakautapu (1998) *Women in Tonga.* Asian Development Bank Country Briefing Paper. http://www.adb.org/Documents/Books/Country_Briefing_Papers/Women_in_Tonga/women_ton.pdf

Gibson, John and David McKenzie (2007) "The Impact of an Ex-Ante Job Offer Requirement on Labor Migration: The New Zealand-Tongan Experience" pp. 215-233 in C. Ozden and M. Schiff (eds.) *International Migration, Economic Development and Policy*. World Bank, Washington D.C.

Gibson, John and David McKenzie (2011) "The Economic Consequences of "Brain Drain" of the Best and Brightest: Evidence from Five Countries", *Economic Journal*, forthcoming

Gibson, John, David McKenzie and Steven Stillman (2011) "The Impacts of Migration on Remaining Household Members: Omnibus Results from a Migration Lottery Program", *Review of Economics and Statistics*, 93(4): 1297-1317

Giné, Xavier, Robert Townsend, and James Vickery (2009) "Forecasting when it matters: evidence from semi-arid India", Mimeo World Bank.

Harris, John and Michael Todaro (1970) "Migration, Unemployment and Development: A Two-Sector Analysis", *American Economic Review* 60(1): 126-142.

Hill, Ruth (2010) "Liberalisation and producer price risk: Examining subjective expectations in the Ugandan coffee market", *Journal of African Economies* 19(4): 433-458.

Horan, Jane (2002) "Indigenous wealth and development: micro-credit schemes in Tonga", *Asia Pacific Viewpoint* 43(2): 205–221.

Jensen, Robert, (2009) "The perceived returns to education and the demand for schooling", *Quarterly Journal of Economics* 125(2): 515-48.

Kaester, Robert and Ofer Malamud (2010) "Self-selection and international migration: New evidence from Mexico", NBER Working Paper no. 15765.

Kapur, Devesh and John McHale (2005) *Give us your best and brightest: The global hunt for talent and its impact on the developing world*, Center for Global Development: Washington, DC.

Lee, Helen Morton (2003) *Tongans Overseas: Between Two Shores*. Honolulu: University of Hawaii Press.

Luseno, Winnie K., John G. McPeak, Christopher B. Barrett, Getachew Gebru and Peter D. Little (2003), "The Value of Climate Forecast Information for Pastoralists: Evidence from Southern Ethiopia and Northern Kenya," *World Development*, 31(9): 1477-1494

Lybbert, Travis, Christopher Barrett, John McPeak, and Winnie Luseno (2007) "Bayesian herders: asymmetric updating of rainfall beliefs in response to external forecasts" *World Development* 35 (3), 480–497.

Mai, Nick (2004) "Looking for a More Modern Life…:the Role of Italian Television in the Albanian Migration to Italy", *Westminster Papers in Communication and Culture* 1(1): 3-22.

Mahmoud, Toman Omar and Christoph Trebesch (2010) "The economics of human trafficking and labour migration: Micro-evidence from Eastern Europe", *Journal of Comparative Economics* 38(2): 173-88.

Manski, Charles (2004) "Measuring Expectations", *Econometrica* 72(5): 1329-76

Massey, Douglas (2006) "Long Day's Journey into Night: One Person's Reflections on International Migration", *Qualitative Sociology*, 29(1): 111-116.

McKenzie, David (2007) "Remittances in the Pacific", pp. 99-121 in Susan Pozo (ed.) *Immigrants and their International Money Flows*, W.E. Upjohn Institute for Employment Research: Kalamazoo, MI.

McKenzie, David and Hillel Rapoport (2010) "Self-selection patterns in Mexico-U.S. migration: the role of migrant networks", *Review of Economics and Statistics*, 92(4): 811-821.

McKenzie, David, John Gibson and Steven Stillman (2010) "How Important is Selection? Experimental Vs Non-experimental Measures of the Income Gains from Migration", *Journal of the European Economic Association* 8(4): 913-45.

Munshi, Kaivan (2003) "Networks in the modern economy: Mexican migrants in the U.S. labor market", *Quarterly Journal of Economics* 118(2): 549-97.

Parey, Matthias and Fabian Waldinger (2011) "Studying abroad and the effect on international labour market mobility: Evidence from the introduction of Erasmus" *The Economic Journal* 121(551): 194-222.

Santos, Paulo and Christopher Barrett (2006) "Heterogeneous Wealth Dynamics: On the roles of risk and ability", Mimeo. Cornell University.

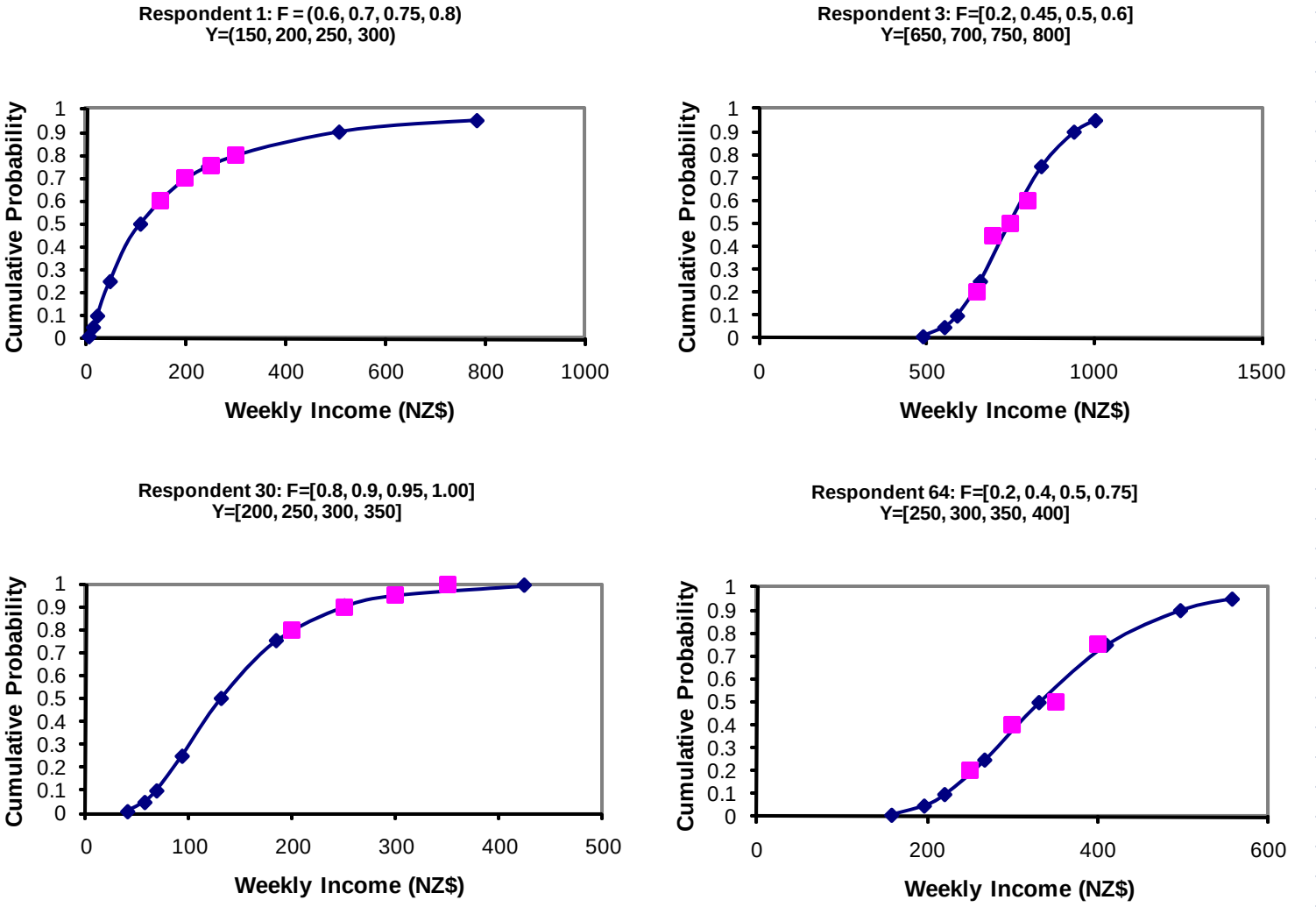
Sayad, Abdelmalek (2004) *The Suffering of the Immigrant*. Polity Press, Cambridge, MA.

Somerville, Kara (2011) "Strategic Migrant Network Building and Information Sharing: Understanding 'Migrant Pioneers' in Canada", *International Migration*, forthcoming.

Sjaastad, Larry (1962) "The Costs and Returns of Human Migration", *Journal of Political Economy* 70(5): 80-93.

United Nations (2009) *Trends in International Migrant Stock: The 2008 Revision* United Nations, Department of Economic and Social Affairs, Population Division.

Figure 1: Examples of Fitted Lognormal Distributions for Expected Earnings



Note: Squares show probabilities elicited. Diamonds show the 1, 5, 10, 25, 50, 75, 90 and 95th percentiles of the fitted distribution.

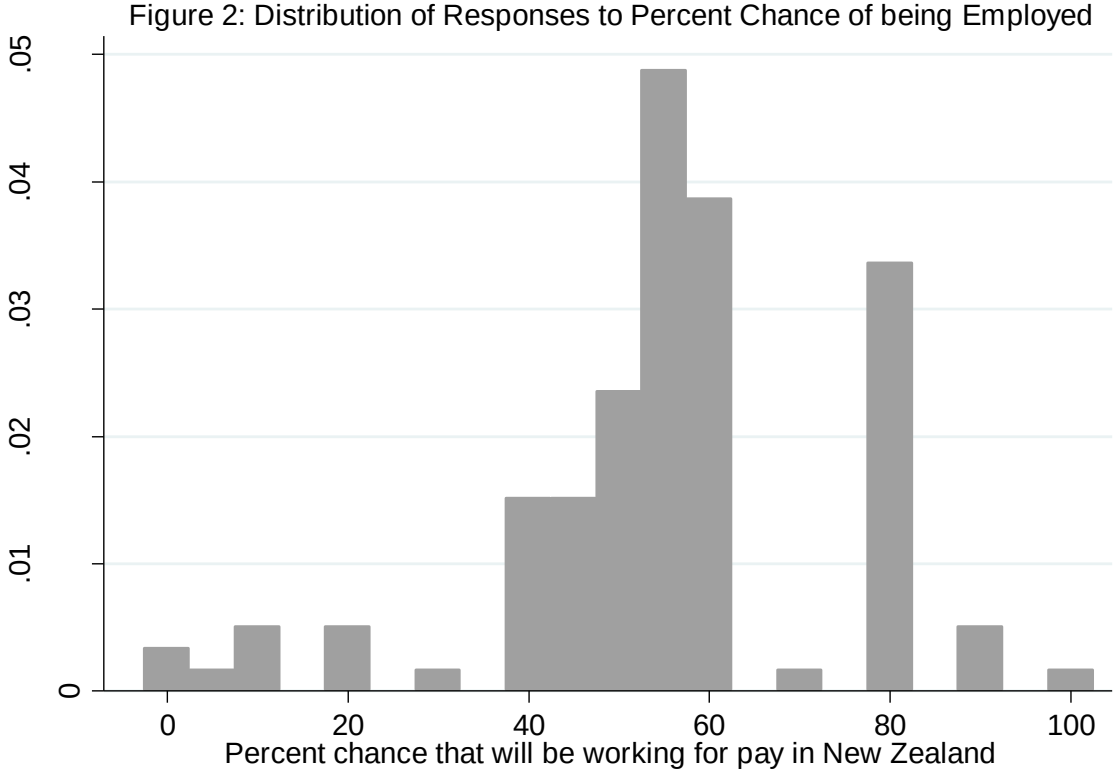


Figure 2: Distribution of Responses to Percent Chance of being Employed
0
.01
.02
.03
.04
.05
0
20
40
60
80
100
Percent chance that will be working for pay in New Zealand

Table 1: Summary Statistics

	Migrants			Non-compliers			All Ballot Winners			Ballot Losers		
	All	Males	Females	All	Males	Females	All	Males	Females	All	Males	Females
Years of Education	12.4	12.1	13.0	11.3	10.6	11.9	12.3**	11.9*	12.9*	11.6	11.3	12.0
Age	34.0	34.8	32.6	35.9	36.6	35.2	34.5	35.3	33.3	34.0	34.0	33.9
Percent married	0.68	0.79	0.50	0.66	0.71	0.60	0.68	0.78	0.52	0.69	0.78	0.58
Usual income in Tonga	126	130	120	146	136	155	130	131	127	118	101	140
Years in New Zealand	0.89	0.87	0.93									
Number of Observations	101	63	38	29	14	15	130	77	53	120	65	55

Notes:

*, **, and *** denote difference between ballot winners and ballot losers is statistically significant at the 10, 5, and 1% levels respectively.

Table 2: Actual and Expected Employment Rates in New Zealand

	# obs	Mean	S.D.	25th	Median	75th	95% C.I. for the mean
Percent of PAC principal applicants employed in NZ	101	81.2					[73.4,88.9]
male migrants	63	90.5					[83.0,97.9]
female migrants	38	65.8					[50.0,81.6]
Percent of PAC ballot losers employed in Tonga	120	71.7					
Percent chance that they…							
Would be working for pay if living in NZ now	119	55.5	18.6	50	55	60	[52.1,58.9]
for males	65	55.4	20.3	50	55	60	[50.3,60.4]
for females	54	55.6	16.6	50	55	60	[51.1,60.1]
Bounds for what employment would be in New Zealand under different assumptions on non-compliers							
a) Assuming that all non-compliers would be unemployed							
All		66.8					
Males		75.0					
Females		54.5					
b) Assuming that only 25% of non-compliers would be employed							
All		71.7					
Males		79.4					
Females		59.0					

Table 3: Actual and Expected Conditional Weekly Income Distributions
Weekly income in New Zealand dollars conditional on working

	Mean	S.d.	10th	25th	50th	75th	90th
Actual Income:							
Actual Income for Migrants in NZ (n=81)	522	229	360	420	480	570	675
Males (n=56)	558	256	400	440	500	600	700
Females (n=25)	442	123	300	380	420	520	625
Expected Income (n=119)							
Lowest amount expected by those in Tonga	227	115	100	100	200	300	400
Highest amount expected by those in Tonga	574	288	200	300	500	800	1000
Expected earnings distribution							
Mean of expected earnings	377	206	111	192	348	570	646
5th percentile	170	133	20	58	143	256	378
10th percentile	195	142	29	69	182	278	408
25th percentile	248	160	49	95	235	354	455
50th percentile	329	191	85	135	326	500	555
75th percentile	449	247	135	224	410	695	770
90th percentile	608	347	224	315	507	877	1112
95th percentile	739	451	298	397	605	1010	1384
Expected Income for Males (n=64)							
Lowest amount expected by those in Tonga	200	93	100	100	200	300	300
Highest amount expected by those in Tonga	506	242	300	300	400	600	900
Expected earnings distribution							
Mean of expected earnings	339	195	122	168	286	523	633
5th percentile	143	122	20	49	127	199	271
10th percentile	165	130	28	62	147	235	307
25th percentile	214	147	49	90	184	308	404
50th percentile	290	178	88	132	253	451	520
75th percentile	406	235	150	202	353	631	745
90th percentile	562	337	250	308	497	808	1057
95th percentile	693	441	300	380	558	953	1339
Expected Income for Females (n=55)							
Lowest amount expected by those in Tonga	260	130	100	200	300	300	400
Highest amount expected by those in Tonga	654	318	200	400	600	1000	1000
Expected earnings distribution							
Mean of expected earnings	421	211	111	241	461	613	662
5th percentile	203	140	29	86	190	294	391
10th percentile	230	149	37	106	236	331	430
25th percentile	288	167	55	149	308	411	506
50th percentile	375	197	85	219	419	527	611
75th percentile	499	252	135	286	556	713	770
90th percentile	661	354	208	351	650	906	1112
95th percentile	792	461	298	400	705	1013	1384

Table 4: Actual and Expected Unconditional Weekly Income Distributions

Weekly work income in New Zealand dollars, whether or not working

	Mean	S.d.	10th	25th	50th	75th	90th
Actual income for Migrants in New Zealand (n=100)	423	291	0	337	473	540	650
Males (n=62)	504	294	260	430	488	600	692
Females (n=38)	291	235	0	0	375	480	540
Mean of Unconditional Expected Earnings Distribution (n=118)	213	122	60	111	207	310	356
Males (n=64)	188	106	62	98	187	286	335
Females (n=54)	244	134	58	145	254	334	389
Bounds for what ballot winners would earn in New Zealand under different assumptions on non-compliers							
a) Assuming non-compliers would earn zero in New Zealand							
All	348						
Males	415						
Females	239						
b) Assuming non-compliers would earn at the 25th percentile							
All	408						
Males	491						
Females	239						

Table 5: Do expectations help predict the desire to migrate?

Dependent variable: Dummy for whether or not they applied for the Pacific Access Category

	All	Males	Females
Mean of unconditional expected income (100s)	0.12***	0.08	0.11***
	(0.035)	(0.052)	(0.044)
Female dummy	0.14*		
	(0.072)		
Employed in Tonga in 2004	-0.21*	-0.22	-0.23
	(0.115)	(0.143)	(0.173)
Income in Tonga in 2004 (100s)	0.17***	0.15**	0.23**
	(0.063)	(0.075)	(0.115)
Age	-0.01	-0.01	-0.00
	(0.006)	(0.007)	(0.007)
Total Migrant Network in New Zealand	0.08**	0.06	0.07*
	(0.036)	(0.053)	(0.043)
Extended Family in New Zealand	-0.06	-0.09	-0.03
	(0.084)	(0.116)	(0.090)
Number of Observations	202	125	77

Note: marginal effects from probit estimation over sample of non-applicants and ballot losers

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

Table 6: Do males have correct expectations about work in Tonga?

	Mean	S.D.	25th	Median	75th
Employment					
Actual Employment					
Percent of male Unsuccessful ballots employed in Tonga	66.2				
Expected Employment					
Percent chance that male migrants would be working for pay if they were living in Tonga now	66.7	37.9	30	85	100
Conditional Income (for those working)					
Actual Income					
Income of male Unsuccessful ballots in 2005 (n=43)	187	99	100	180	220
Expectations of Income if working in Tonga					
Mean of expected earnings for males (n=57)	192	189	72	106	244

All income amounts are expressed in Tongan pa'anga.

Table 7: Correlates of Expectations of Earnings and Employment in New Zealand

	Mean Expected Income			Expected Employment Probability			Underestimation of income	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All	Males	Females	All	Males	Females	Males	Females
Usual income in Tonga	0.45***	0.62***	0.35**	0.00	0.00	0.00	-0.93***	-1.10***
	(0.12)	(0.20)	(0.15)	(0.000)	(0.000)	(0.000)	(0.20)	(0.15)
Years of Education	18.49**	8.04	22.91***	0.00	0.03*	-0.01	-11.14	-61.99***
	(7.88	(17.93)	(8.49)	(0.011)	(0.017)	(0.008)	(17.93)	(8.49)
Female	36.75			-0.00				
	(34.96)			(0.036)				
Age	3.28	0.26	5.24	-0.00	-0.00	-0.01*	-1.16	-2.01
	(2.46)	(2.93)	(3.76)	(0.003)	(0.004)	(0.003)	(2.93)	(3.76)
Total Migrant Network in New Zealand	38.70**	51.00	39.02	-0.01	-0.00	-0.01	7.50	-53.26**
	(19.12)	(33.83)	(24.15)	(0.019)	(0.039)	(0.021)	(33.83)	(24.15)
Extended Family in New Zealand	-82.88**	-115.67*	-43.03	0.00	0.01	-0.00	192.65***	43.03
	(38.60)	(58.60)	(59.01)	(0.041)	(0.062)	(0.052)	(58.60)	(59.02)
Constant	-113.43	68.55	-207.12	0.64***	0.22	0.90***	413.45*	1,062.7***
	(141.58)	(244.05)	(181.59)	(0.163)	(0.234)	(0.156)	(244.05)	(181.6)
Observations	120	65	55	120	66	54	65	55
R-squared	0.300	0.270	0.298	0.013	0.051	0.065	0.453	0.741

Notes:
Robust standard errors in parentheses, *, ** and *** indicate significance at the 10%, 5% and 1% levels respectively
Underestimation is the difference between predicted income based on the relationship between individual characteristics and actual income for migrants in New Zealand and mean expected income. A higher value indicates more underestimation.

Table 8: Correlates of Wages Conditional on Working in Tonga and in New Zealand

	Weekly work Income in Tonga		**Weekly work income in NZ**	
	Current income of unsuccessful ballots	Tongan Labor Force Survey	PAC principal applicants	All Pacific Island migrants in NZ Income Survey
Male dummy	-51.91	5.193	134.04**	122.42***
	(33.73)	(5.35)	(65.33)	(20.13)
Years of Education	14.10	10.51***	7.62	#
	(8.60)	(1.42)	(13.06)	
Age	-20.02	-3.024	-6.37	11.53**
	(17.43)	(3.44)	(28.76)	(5.57)
Age Squared	0.39	0.0638	0.18	-0.13**
	(0.26)	(0.054)	(0.45)	(0.067)
Married Dummy	1.74	20.19***	-67.03	34.21
	(33.45)	(5.79)	(68.34)	(24.44)
Constant	288.52	-13.93	382.04	133.80
	(307.43)	(49.75)	(377.32)	(112.44)
Sample Size	84	724	81	503
R-squared	0.202	0.15	0.092	0.16
Mean income:	216.6	102.4	522.4	519.2

Note: weekly work income in New Zealand is in New Zealand dollars
years of education not available in New Zealand IS, so dummies for different educational qualifications were included instead.
Robust standard errors in parentheses, *, ** and *** indicate significance at the 10%, 5% and 1% levels respectively