

Correlates of women's autonomy over economic decisions in Papua New Guinea

Rohan Fox

Abstract

Various interventions have been shown to increase economic autonomy for women and development outcomes, including improved access to banking, entrepreneurship opportunities and financial capability. However, there is limited research on this topic in Papua New Guinea (PNG). This study uses the largest financial inclusion survey undertaken in PNG to introduce three stylised facts on gender, financial inclusion, and economic autonomy. First, women who contribute income to the household are more likely to (a) be responsible for spending personal money, (b) participate in household financial decisions, and (c) be solely or jointly involved in major financial decisions. Second, I find no evidence that women who own a bank account are statistically any more likely to have more autonomy over these three key economic decisions. Third, secondary education and age are positively and weakly associated with women's economic autonomy for smaller financial decisions (i.e., on personal money and participating in household decisions) but not for major decisions.

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1. Introduction

Expanding women's autonomy over economic decisions can benefit women and society, through investment in children, poverty reduction, and higher aspirations for women and girls (World Bank 2012). Greater female autonomy has also been linked to stronger long-term economic growth (Baten & de Plejit 2018). Thus, increasing women's economic autonomy can progress the Sustainable Development Goals (SDGs) of gender equality (SDG5), the eradication of poverty (SDG1), and the achievement of inclusive and sustainable economic growth (SDG8).

This study looks into the factors that are related to women's level of autonomy over their own and their household's economic choices in Papua New Guinea (PNG). Most of the research in this area comes from South Asia and to a lesser extent Sub-Saharan Africa. Unlike South Asia, goods in PNG are relatively expensive due to its remote and largely rural population, impacting entrepreneurship opportunities. Although PNG is classed as a middle-income nation, income is concentrated in the large mining and minerals sector, which employs relatively few people. Most people in PNG work in agriculture and do not share in this wealth, and poverty rates are high by global standards. The traditional cultural norms in PNG are also highly patriarchal. PNG also has some of the highest rates of violence against women in the world.

Women's empowerment is a key issue for local and international organisations working in PNG. However, some programs focused on increasing women's economic resource attainment have led to adverse outcomes. For example, Eves et al. (2018) show that programs which aim to increase women's economic bargaining power have, in some cases, led to greater threats of violence. Thus, focusing on one aspect of empowerment, without understanding the broader cultural context, may be risky. Here, I introduce a series of new stylised facts specific to gender, financial inclusion, and economic autonomy specific to the PNG context.

The study uses a survey conducted by the Institute of National Affairs in 2014 and designed by the World Bank (n=301). The survey is representative of two of the largest provinces, Morobe and Madang, which together contain approximately 16% of PNG's population and are home to two of the five largest urban districts, including the commercial and manufacturing hub Lae. The vast majority of the sample live in non-urban or peri-urban areas (83%), and work subsistence (89%). These are similar figures to PNG as a whole at 87% and 85%, respectively.

I focus on four variables mapping closely to key themes in women's autonomy over economic decisions: (1) income contribution; (2) secondary education; (3) owning a bank account; and (4) age. Specifically, I use the new survey and least absolute shrinkage and selection operator (LASSO) regressions, among other techniques, to examine how these four factors relate to (1) participation in household financial decisions, (2) responsibility for personal spending, and (3) involvement in major household financial decisions. LASSO is particularly helpful for dimension reduction when we have many potential covariates which we do not necessarily want to condition on or use for prediction, but I also present results using OLS and logit regressions progressively adding spatial fixed effects and further controls. Results are similar throughout.

Three key findings emerge. First, whether women contribute income to the household is a robust predictor of all three measures of autonomy. Women who contribute income to the household were 42% more likely to participate in household financial decisions, 34% more likely to be mainly responsible for their own spending, and 18% more likely to be involved in major household financial decisions, compared to women who do not contribute income to the household. Second, I find no evidence that women who have a bank account are any more economically empowered, in any of these three key economic decisions. Third, secondary education and age are positively and weakly associated with women's economic autonomy for smaller financial decisions (i.e., on personal money and participating in household decisions) but not for major decisions.

Some interventions to improve women's earnings have arguably been unsustainable. Eves et al. (2018) show that programs in PNG and the Pacific explicitly aiming to increase women's bargaining power through greater economic resource attainment have, in some cases, led to greater work burden, violence, and partners contributing less to the

household. Thus, women's autonomy does not always have a positive relationship with women's empowerment, and results should be interpreted with this in mind. A greater understanding of what leads to female autonomy, and the contexts in which greater autonomy is positively related to empowerment, may assist policymakers and practitioners to improve their work in this area.

The strongest null result in the paper suggests that bank accounts are not associated with higher levels of female autonomy over key economic decisions. These results take into account whether the bank account is being used or not. Perhaps perversely, the survey data also show that when a women owns, or uses a bank account, take up of informal loans is higher than for women who do not own, or use a bank account. This suggests that even where bank accounts are available, banking services may be limited or of lower perceived quality or trustworthiness than informal lending sources.

Hanushek and Woessmann (2012) find that over the past fifty years differences in the quality of education appear to be more important than access to education in explaining countries' economic performance. In the same way, it may be that assessing the quality of bank services is more important than the level of access (number of bank account holders), which may create perverse incentives to use resources to sign up a larger number of account holders irrespective of their needs and whether they can be met.

The paper proceeds as follows. Section 2 provides background on the potential determinants of women's autonomy. Section 3 introduces the survey and descriptive statistics, and Section 4 describes estimation and presents the main results. Section 5 considers potential implications and offers some concluding remarks.

2. Key determinants of women's autonomy

Nigatu et al. (2014) describe women's autonomy as 'the control of women over their own lives, materials, access to knowledge and information, having equal say with their husbands or partners on matters affecting themselves and their families'. This section looks into the determinants of women's autonomy over three economic decisions: participation in household financial decisions, responsibility for personal spending, and involvement in major household decisions, thus providing a conceptual framework guiding the explanatory variables explored in the paper.

The lack of ownership of bank accounts by women in PNG is thought to be a key reason why many lack economic autonomy (Bank of Papua New Guinea [BPNG] 2015). Women in PNG are 29 percentage points less likely to own an account than men, the highest gender gap in the Pacific region and far higher than the average global gap of 8 percentage points (Pacific Financial Inclusion Program [PFIP] 2020).

In rural Philippines, a commitment savings intervention increased decision-making for less empowered women (Ashraf, Karlan & Yin 2006, 2010). Knowles (2013) reviewed nine randomised experiments from around the world and concludes that savings are considered a promising way to improve rural women's productivity. Savings accounts were found to help women smooth their income and reduce reliance on short-term debt in Chile (Kast & Pomeranz 2014). In Kenya, Dupas and Robinson (2009, 2013) show that women entrepreneurs with access to savings accounts put 45% more cash into their businesses and were better able to respond to external shocks, with this effect persisting in a follow-up study three years after the initial intervention. In addition to savings themselves, bank accounts can act as a 'gateway' to further banking products such as loans, which can be used by entrepreneurs to grow their businesses.

Several studies find that greater access to banking creates opportunities for entrepreneurialism and increases women's participation in economic decisions. Female members of the Grameen Bank in Bangladesh reported higher levels of involvement in major household decisions (Van den Bold et al. 2013). In Nepal, Shrestha (1998) noted that involvement in microfinance increased female autonomy to spend on daily household items, helped women resist domestic abuse, and increased participation in community decision-making. In Cote D'Ivoire, access to microcredit increased women's decision-making power in the household (Fofana et al. 2015). Nessa et al. (2012) and Islam et al. (2014) argue that greater accessibility to credit in Bangladesh enabled women to establish small businesses and generate income that they contribute to the household, which then improved their bargaining power.

Prior research on household bargaining tends to suggest that female autonomy over household economic decision-making is influenced by the relative income contribution of women. Studies from developing and developed countries suggest that an increase in relative income improves female participation in household decision-making

(Ashraf et al. 2010). In Bangladesh, Chowdhury et al. (2005) find that the ability to generate income can increase women's autonomy, enhance their economic and social status and shift power relations, including over budgets at the household level. Roy et al. (2017) find that higher rates of female contribution to household income is associated with greater involvement in household decisions.

The type of jobs that women have can also play a role in determining their relative income. Colfer et al. (2015) find that sectors with more gendered roles led to different income contributions between men and women in Indonesia, which had a flow-on effect to household economic decisions. In most developing countries, and this is also the case in PNG, men are more likely to have a job in the formal sector (i.e., be paid a wage), whereas women are more likely to work in the informal sector (i.e., on farm or off farm business activities). 85% of PNG women are engaged in vulnerable employment, compared to only 65% of men (PFIP 2020).

There is also evidence that greater autonomy is not necessarily linked to greater empowerment. A meta-analysis by Vogler (2005) shows that responsibility for financial management is a burden when there is limited income to get by. Mader and Schneebaum (2013) note that in Eastern Europe, women were more likely to make financial decisions only when the households reported tough economic conditions.

Lower levels of formal education and financial literacy are often cited as reasons why women have lower economic autonomy. Malhotra et al. (2003) show that higher education is related to greater involvement of women in household decision-making in India. Sai Sujatha and Brahmananda Reddy (2009) and Chanda et al. (2012) show a link between education and greater autonomy for women around household purchasing decisions in India and Bangladesh, respectively. The Organization for Economic Cooperation and Development (OECD) notes that in most developing countries, women display lower financial literacy levels than men (OECD 2013). Data from Rwanda suggests that greater financial knowledge contributes to increased involvement in household financial decisions (Grohmann & Schoofs 2018).

In PNG, women are less likely to complete secondary school than men (30% compared to 36% in the sample). They are also substantially less likely to be able to communicate in English (45% compared to 69% in the sample). This leads to women being

disproportionally excluded from the formal financial sector as banks in PNG typically communicate in English (PFIP 2020).

While greater income for women has been shown to lead to greater bargaining power in the household in several studies, Mabsout and Van Staveren (2010) suggest that across countries 'women's individual level bargaining power may be overruled by the influence of culture, and more specifically of gendered institutions in society' (p. 784). Ghosh and Gunther (2017) provide evidence in support of this in India, finding that gender-based violence at home affects the use of bank accounts. Districts that undertook programs to promote universal financial inclusion had a large increase in bank account ownership, but a decrease in the rate of use of bank accounts by working women. The low usage was the result of male backlash in response to an undermined economic role at home (Ghosh & Gunther 2017). Similar dynamics are at play in PNG where gender-based violence is common (PFIP 2020).

Entrenched cultural financial exchange practices underpin relationships, such as the paying of a bride price, which are not easily changed. Kaye et al. (2005) illustrate that in Uganda both men and women commonly view the paying of a bride price as women being 'bought' and this reduces a woman's decision-making role, limits independence and perpetuates unequal gender power relations. Lewis et al. (2008) provides evidence from PNG that supports this idea that cultural practices entrench expectations and power dynamics towards female submission.

In PNG, cultural norms mean that men are typically the household head and women are responsible for running the household on a day-to-day basis. These cultural norms place a large burden on women, who rely on other family members (mainly women) to provide them with a safe place to save informally outside the household (PFIP 2020). Many women often feel trapped by cultural norms, and are not optimistic that it is possible to overcome them: for example, one young, female participant in a focus group stated 'unspoken cultural rules still control us' (PFIP 2020, p. 14).

3. Data

3.1 Survey and sample

This study draws on a representative financial inclusion survey conducted by the PNG Institute for National Affairs (INA) and World Bank in 2014 (World Bank 2014). The survey was designed to capture information about who is involved in making decisions about household expenditure, respondents' budgeting and savings behaviour, income, and ownership and use of bank accounts. The questions were developed by the World Bank and similar surveys have been used in 14 low- and middle-income countries in Latin America, Africa, the Middle East and East Asia, and the Pacific.¹ At the time of writing, this is one of only two large-scale surveys in PNG related to financial inclusion and decision-making within households that collects a representative sample.²

The survey was conducted from July to December 2014. A total of 688 individuals were interviewed in 359 households across eight districts in Morobe and Madang provinces.³ Women and men from the same household were interviewed separately, by an enumerator of their own gender (i.e., women were interviewed by women). My analysis focuses on a subgroup of respondents, and in particular examines the level of responsibility women have for financial decision-making in their household where a male is the household head. Women who were single or widows who may have had sole responsibility for financial decisions only because there is no adult male in the household were excluded: 301 women fit the criteria.⁴

¹ The questionnaire can be obtained on request by contacting the author of this paper.

² The other survey was conducted as part of a randomised control trial in Wewak district in East Sepik Province. As there were substantial differences in the sampling method the results of the two surveys are not directly comparable.

³ The eight districts are: Bulolo, Finschafen, Huon, Lae, Markham, Menyamyra, Rai Coast, and Sumkar.

⁴ Data used reflect women's spoken responses to a female survey administrator. Surveys were completed without the presence of others where possible. However, it was not always possible to complete the survey without others present, and we do not have data on how often this occurred.

3.2 Descriptive statistics

The survey used questions to measure women's involvement in financial decision-making similar to those asked in standard demographic and health surveys. Table 1 presents descriptive statistics for the outcome and explanatory variables. Explanatory variables are split into those of interest and potential controls. With LASSO, some controls are removed by regularisation, a process which reduces coefficients to zero that do not pass a threshold. Variables of interest — those identified as key in the literature — pass through the LASSO and are always included in the regression. Control variables are determined by LASSO whether to be included or not. LASSO is often used to sift through large numbers of independent variables where control variables are often chosen at random, helping with dimension reduction. Here, I chose control variables based on issues that have been mentioned in the literature on women's economic empowerment but were not identified as major themes.

The data show that men in PNG hold significant sway over how personal and household money is spent, which increases as the importance of the purchase gets larger. 85% of women reported participating in household economic decisions (the highest positive response on an outcome variable), with just 58% of women saying that they were mainly responsible for their own spending decisions and 35% of respondents solely or jointly responsible for major household purchases. In contrast, 97% of male heads of household report participating in household decisions, 86% report being responsible for spending their own money, and 90% report being solely or jointly responsible for major decisions.

Female bank account ownership is low, overall and compared to men. 14% of women reported owning a bank account, less than half the rate of males (30%). A slightly higher share of female respondents report using a bank account (16%). This supports the information noted in Section 2 which suggests that women sometimes use the account of a family member, while not owning an account themselves.

Almost all female bank account holders lived in households in the top two income quintiles. The median household income of women with bank accounts is 1,000 kina per month, compared with the median sample household income of 200 kina per month.

Table 1: Descriptive statistics

		Mean	Std. dev	n
Outcomes of interest				
Participates dummy	Respondent participates in household financial decisions	0.85	0.35	301
Personally responsible dummy	Respondent is mainly responsible for her own personal spending	0.58	0.49	301
Involved major dummy	Respondent is solely or jointly responsible for major household purchases	0.36	0.48	301
Explanatory variables				
Bank account dummy	Respondent currently owns a saving/cheque account/debit card/passbook from a bank, microfinance or savings and loan institution	0.14	0.34	301
Secondary education dummy	Respondent's highest level of schooling completed is secondary level or higher	0.16	0.36	301
Contributes dummy	Respondent contributes to household income	0.91	0.28	301
Age 18–34	Respondent's age is 18–34	29.0	3.9	147
Age 35–54	Respondent's age is 35–54	41.5	5.2	134
Age 55+	Respondent's age is 55+	59.3	4.2	16
Control variables				
Urban dummy	Respondent lives in urban or peri-urban area	0.15	0.36	301
No. household members	Number of household members	6.1	2.53	301
No. working household members	Number of working household members	2.38	1.18	301
Uses bank account dummy	Respondent uses their bank account	0.16	0.36	301
Self-employment income dummy	Respondent's main income is self-employment (including subsistence, own farm, fishing, unpaid family worker)	0.85	0.36	301
Wage income dummy	Respondent's main income is from employment in the formal sector	0.14	0.35	301
Bank account dummy male	Male head of household owns a savings/cheque account/debit card/passbook from a bank, microfinance or savings and loan institution	0.3	0.46	301
Secondary education dummy male	Male head of household's education level is secondary or higher	0.29	0.45	301
Uses bank account dummy male	Male head of household uses their bank account	0.23	0.42	301
Age male 18–34	Male head of household's age is 18–34	29.8	3.4	82
Age male 35–54	Male head of household's age is 35–54	42.1	5.3	168
Age male 55+	Male head of household's age is 55+	62.5	6.4	31

The percentage of women who had ever taken out a formal loan is 2%. The percentage of women taking out an informal loan, through a member of family or other informal money lender, is 10%. Women who own bank accounts are 11% more likely to take out a loan from an informal lender than women without accounts, not taking other factors into account. The same likelihood-figure for women who use their bank account is 20%.

Secondary school education rates are low, with female respondents less likely to have attended secondary school than male respondents (16% compared to 25%). I use secondary completion as a crude proxy for financial literacy.

4. Methods and results

4.1 Model selection

This study aims to identify what characteristics are statistically associated with women's autonomy over personal and household economic decisions in PNG. For each of the three outcome variables, I run a regression that includes a series of independent variables capturing non-cultural factors that may affect women's economic autonomy: owning a bank account, secondary education, contributing to household income, and age.⁵

My main approach is a simple LASSO regression, a machine learning algorithm used primarily for model selection. The cross-fit partialing out method is used which creates a model that can be used for inference. Of the three techniques available to make a LASSO model that can be used for inference, the cross-fit partialing out method is generally considered the most robust. LASSO allows me to model variables of interest, adjust for a few key potential confounders, and limit potential multicollinearity through dimension reduction.

My primary specification is an OLS LASSO regression for easier interpretability. I also present results using a logit LASSO model, since the outcomes are binary, and including

⁵ It is assumed that all households are patrilineal. As Hogbin (1973) notes, only Milne Bay and Island provinces follow matrilineal systems of intergenerational land or wealth transfer. The survey does not sample respondents from any of these provinces. Only 12 people, or 4% of the respondents, identified as being in polygamous relationships.

spatial unit fixed effects, to focus comparisons on individuals within localities (i.e., adjusting for common factors affecting autonomy which vary across localities).

4.2 Regression results

Tables 2–4 present the main results for each outcome: whether the respondent participates in household financial decisions, whether the respondent is mainly responsible for her own household spending, and whether the respondent is solely or jointly responsibly for major financial decisions, respectively. In each table, Columns 1–3 present LASSO OLS results, Columns 4–6 present LASSO logit results, and Columns 7–9 present standard OLS results. For each estimation approach, I present results without any regional dummy variables, with seven district fixed effects, and with 30 census unit fixed effects. All estimates include an urban-rural dummy variable. The two generally robust findings across all specifications are that (a) women who contribute income to the household are more likely to have greater autonomy over all the economic decisions measured, and (b) women who own a bank account are no more likely to have greater levels of economic autonomy.

Table 2 examines the correlates of whether a female respondent participates in household financial decisions (a dichotomous variable). Column 1 presents the baseline LASSO OLS estimate with no additional regional fixed effects. Holding all else equal, someone who owns a bank account is 9% less likely to participate in household expenditure decisions. This difference is not statistically significant at conventional levels, but of a non-trivial economic magnitude. Looking at the raw data (i.e., without the conditioning on covariates involved in the regressions) in Table A1 (in the Appendix), we see that 11% of women with bank accounts participate in household expenditure decisions compared to 25% for those without.

The second row of Column 2 of Table 2 shows that women who have completed secondary education are around 15% more likely to be involved in household expenditure decisions. This difference is statistically significant at the 5% level. The third row shows that a woman who contributes financially to household income is around 42% more likely to participate in household spending decisions, holding all else equal. This conditional difference is precisely estimated, statistically significant at the 1% level.

Finally, the bottom rows show us that women are more likely to be involved in household spending decisions if they are older, but these differences are imprecisely estimated (i.e., not statistically significant at conventional levels). Columns 2 and 3 of Table 2 progressively add district and census unit fixed effects, and Columns 4–6 and 7–9 repeat the exercise using LASSO logit and OLS. The patterns described thus far are observed regardless of the specification, and coefficients are not statistically distinguishable across columns. Perhaps surprisingly, the results on secondary education and on contributing to household income go through even relying on within census unit variation.

Table 2: Respondent participates in household financial decisions

	LASSO OLS			LASSO logit ^(a)			OLS		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Owns a bank account dummy	-0.090 (0.078)	-0.099 (0.077)	-0.106 (0.078)	-1.025* (0.604)	-0.846 (0.583)	-1.009 (0.614)	-0.088 (0.070)	-0.086 (0.070)	-0.073 (0.077)
Secondary education dummy	0.155** (0.078)	0.159** (0.075)	0.139* (0.076)	1.567* (0.821)	1.500** (0.737)	1.391* (0.764)	0.146** (0.072)	0.138* (0.073)	0.147* (0.080)
Contributes to household income dummy	0.418*** (0.091)	0.419*** (0.093)	0.424*** (0.096)	2.541*** (0.536)	2.503*** (0.518)	2.227*** (0.505)	0.427*** (0.077)	0.447*** (0.079)	0.440*** (0.085)
Age range: 18–34 dummy (ref)	–	–	–	–	–	–	–	–	–
Age range: 35–54 dummy	0.020 (0.043)	0.031 (0.043)	0.031 (0.042)	0.433 (0.449)	0.482 (0.433)	0.485 (0.440)	0.040 (0.048)	0.030 (0.048)	0.040 (0.051)
Age range: 55+ dummy	0.081 (0.097)	0.074 (0.101)	0.095 (0.104)	1.019 (1.002)	0.868 (0.984)	0.329 (0.886)	0.105 (0.107)	0.086 (0.107)	0.064 (0.115)
Regional fixed effects	None	District	Census Unit	None	District	Census Unit	None	District	Census Unit
Observations	301	301	301	301	301	231	301	301	301

Standard errors in parentheses

* p<0.10 ** p<0.05 ***p<0.01

(a) The LASSO logit results for this table use the double selection method rather than the cross-fit partialing out method, as the latter regression did not meet GMM conditions. The double selection method is a less robust/conservative method for creating LASSO coefficients for inference.

Table 3 reports results using whether the respondent is mainly responsible for her own personal spending as the outcome of interest. Specifications follow those in Table 2. The main result here is that women who contribute to household income are around 35% more likely to be mainly responsible for their own spending. The differences are precisely

estimated, statistically significant at the 1% level, and similar in magnitude across specifications. The magnitudes are also similar; that is, not statistically different to those in Table 2 where whether a women participates in household decisions at all is used as the outcome. Coefficients on the other key variables of interest — owning a bank account, secondary education, and age — are not statistically significant throughout, and all positive. The magnitude on secondary education is not trivial and similar to that in Table 2, but less precisely estimated.

Table 3: Respondent is mainly responsible for her own personal spending

	LASSO OLS (1, 2, 3)			LASSO logit (4, 5, 6)			OLS (7, 8, 9)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Owns a bank account dummy	0.071 (0.096)	0.090 (0.095)	0.055 (0.095)	0.406 (0.537)	0.461 (0.666)	0.303 (0.504)	0.067 (0.102)	0.095 (0.098)	0.109 (0.112)
Secondary education dummy	0.151 (0.105)	0.135 (0.105)	0.128 (0.110)	0.692 (0.543)	0.818 (0.669)	0.657 (0.566)	0.158 (0.106)	0.156 (0.102)	0.179 (0.115)
Contributes to household income dummy	0.341*** (0.082)	0.383*** (0.084)	0.376*** (0.092)	1.867*** (0.574)	2.043*** (0.703)	1.825*** (0.554)	0.364*** (0.113)	0.430*** (0.111)	0.342*** (0.122)
Age range: 18–34 dummy (ref)	–	–	–	–	–	–	–	–	–
Age range: 35–54 dummy	0.052 (0.067)	0.049 (0.067)	0.025 (0.069)	0.197 (0.302)	0.180 (0.323)	0.240 (0.300)	0.072 (0.071)	0.039 (0.068)	0.049 (0.073)
Age range: 55+ dummy	0.107 (0.133)	0.088 (0.129)	0.082 (0.129)	0.657 (0.591)	0.619 (0.656)	0.581 (0.553)	0.135 (0.157)	0.090 (0.150)	0.031 (0.166)
Regional fixed effects	None	District	Census Unit	None	District	Census Unit	None	District	Census Unit
Observations	301	301	301	301	301	301	301	301	301

Standard errors in parentheses

* p<0.10 ** p<0.05 ***p<0.01

Table 4 presents results for the final outcome of interest: whether the respondent is solely or jointly responsible for major financial decisions. The patterns are similar to that in Table 3, where there is a statistically significant relationship between income contribution and the outcome but not the other variables. Women who contribute income are about 18% more likely to be responsible for major financial decisions (Column 1), half the magnitude of the other two outcomes examined in Tables 2 and 3. These

estimates are slightly less precise than those for the other outcomes of interest. The coefficient on secondary education is very small and not statistically distinguishable from zero, whereas the magnitudes on age and bank accounts are broadly similar to the other outcomes.

Table 4: Respondent is solely or jointly responsible for major financial decisions

	LASSO OLS (1, 2, 3)			LASSO logit (4, 5, 6)			OLS (7, 8, 9)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Owns a bank account dummy	0.069 (0.098)	0.078 (0.098)	0.112 (0.097)	0.311 (0.463)	0.279 (0.451)	0.383 (0.449)	0.076 (0.102)	0.070 (0.103)	0.145 (0.112)
Secondary education dummy	0.004 (0.103)	0.002 (0.101)	-0.028 (0.100)	-0.040 (0.504)	0.039 (0.493)	0.022 (0.494)	-0.013 (0.106)	-0.019 (0.107)	-0.068 (0.116)
Contributes to household income dummy	0.180** (0.082)	0.176** (0.080)	0.175** (0.084)	0.875 (0.580)	0.979* (0.579)	0.910 (0.579)	0.197* (0.113)	0.230** (0.117)	0.265** (0.122)
Age range: 18–34 dummy (ref)	–	–	–	–	–	–	–	–	–
Age range: 35–54 dummy	0.070 (0.067)	0.058 (0.066)	0.070 (0.068)	0.268 (0.317)	0.310 (0.304)	0.348 (0.307)	0.085 (0.070)	0.080 (0.071)	0.115 (0.073)
Age range: 55+ dummy	-0.001 (0.139)	-0.011 (0.142)	0.001 (0.140)	0.103 (0.699)	-0.084 (0.703)	0.012 (0.659)	0.052 (0.156)	0.067 (0.157)	0.087 (0.166)
Regional fixed effects	None	District	Census Unit	None	District	Census Unit	None	District	Census Unit
Observations	301	301	301	301	301	301	301	301	301

Standard errors in parentheses
 * p<0.10 ** p<0.05 ***p<0.01

In summary, whether a woman financially contributes to household income is the most robust correlate of economic autonomy across all outcomes considered. Secondary education only appears to matter for general engagement in financial decisions, not women’s autonomy over their own spending or for major decisions. The key robust null finding across all outcomes is that owning a bank account has no statistically significant relationship with economic autonomy. The results also show that an increase in each age category (around 20 years) leads to approximately a 5 to 10% increase in the propensity to have autonomy over two of the three of the decisions measured, but these changes are

not statistically significant at conventional levels. Finally, complete OLS results, reporting all the coefficients on controls, are provided in Table A4.

One potential concern with the regressions presented thus far is that, by conditioning on covariates and other variables of interest, I may be ‘partialling’ out some of the correlation of interest. That is, the partial correlation may be of less interest than the unconditioned raw differences. Figures 1–3 present simple bar graphs, with 95% confidence intervals, for whether the respondent contributes to household income, whether the respondent owns a bank account, and whether the respondent has at least secondary education. The patterns align closely with the regression results in Tables 2–4. More formal balance tests, comparing the raw differences in the values of the explanatory variables across each of the three binary outcome variables with t-tests and normalised differences, are in Tables A2–A4. Again, patterns are similar.

Figure 1: Contributions to household income and autonomy

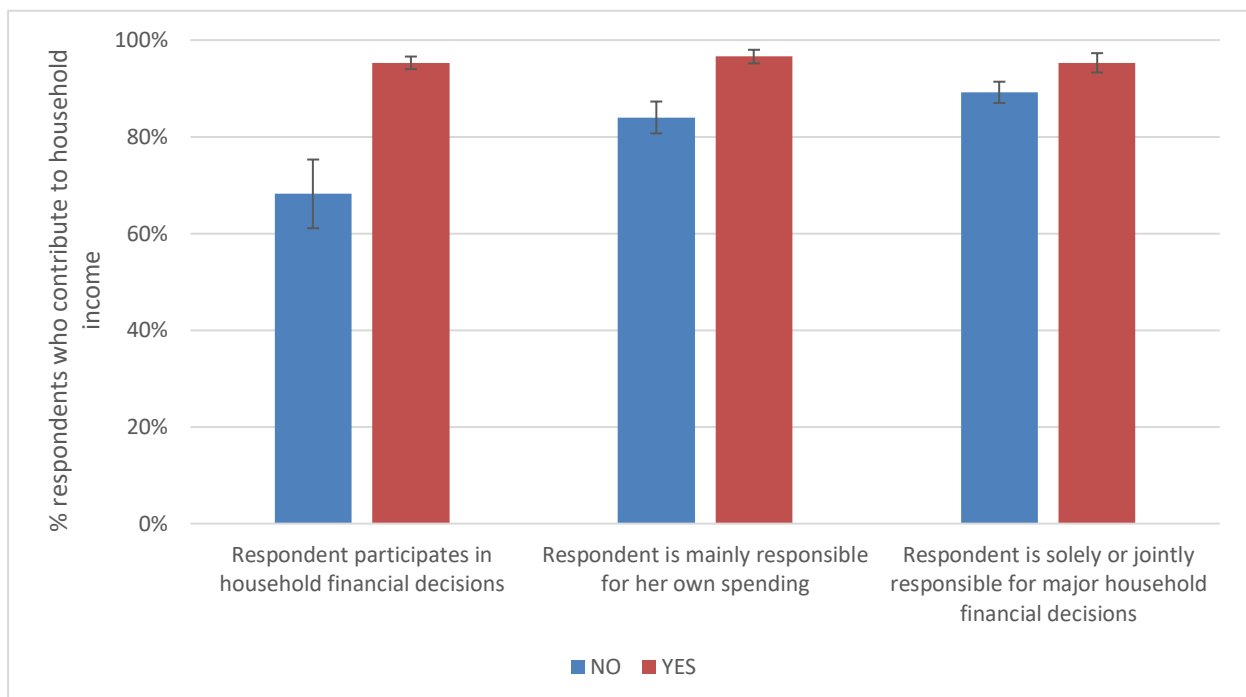


Figure 2: Bank account ownership and autonomy

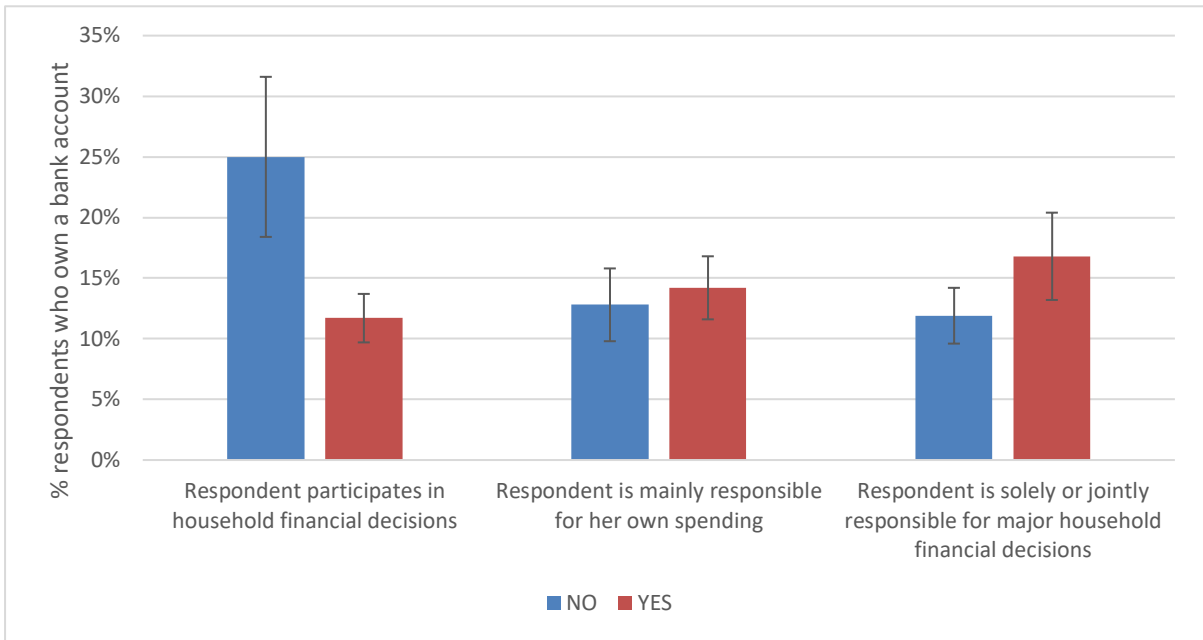
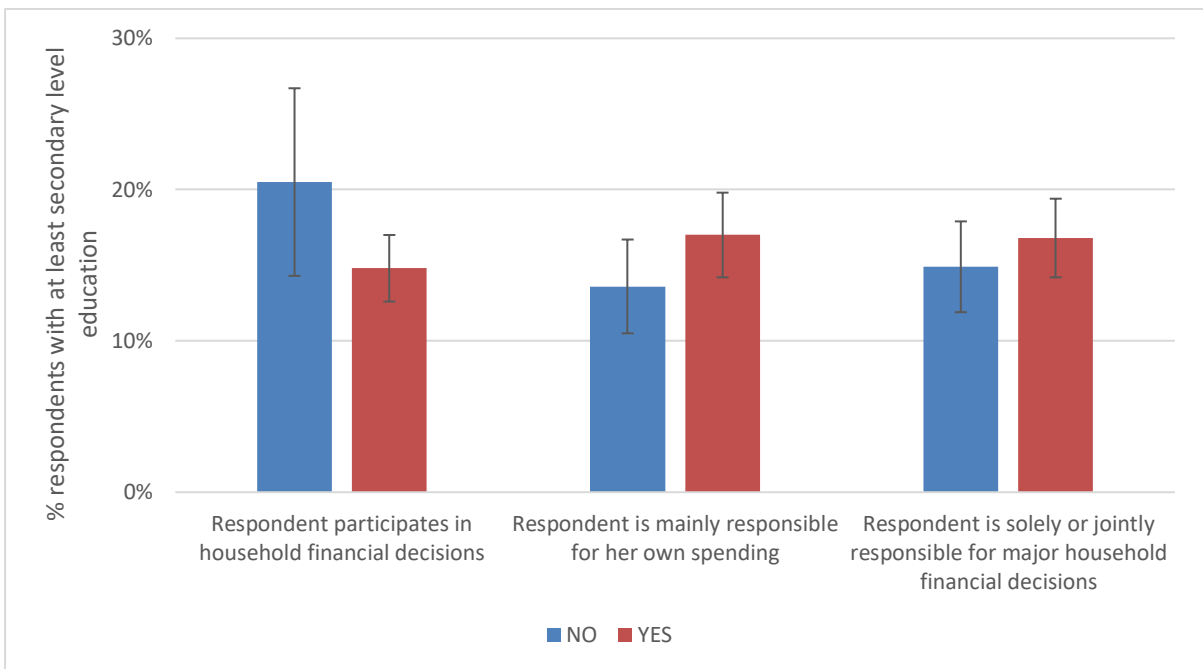


Figure 3: Education and autonomy



5. Discussion

5.1 Income contribution

The strongest result from this study shows that income contribution is related to involvement in all the economic decisions measured, particularly personal spending autonomy and participation in household spending decisions. One potential explanation is that it is easier to have autonomy over money that you earn. It could also be the case that the relationship goes the other way: women with more autonomy are more able to earn and contribute income to the household.

There have been programs designed to get women into the workforce and improve women's earning capacity in PNG and around the world. Some of these have had major unintended negative consequences (see, e.g., Eves et al. 2018). The changing intra-household bargaining and power dynamics associated with increased female autonomy may also increase violence against women (e.g., as men strive to retain power in other ways), something that should be carefully considered and managed when thinking through these types of economic autonomy programs.

5.2 Bank accounts

Buvinic and Furst-Nichols (2014) suggest that savings interventions increase women's empowerment, more so than other interventions. Providing bank accounts and training to women has been a focus of financial inclusion programs in PNG and around the world. I find that owning a bank account is not a statistically significant predictor of female economic autonomy, as proxied by autonomy over personal spending, participation in household spending decisions, and involvement in major household spending decisions.

There is also a narrative on the effect of financial inclusion on female financial autonomy, which states that higher levels of financial inclusion boosts the bargaining power of women in their household (BPNG 2015). However, owning a bank account is not statistically associated with women being more responsible for their own spending, or more involved in household spending decisions.

Social, political, and economic reasons could explain why bank accounts are not related to economic autonomy in the same way that they are in other countries (Van den Bold et al. 2013). For example, a lack of infrastructure, poor governance, corruption, and high crime may make it more difficult to start up a profitable small business. This would mean that bank accounts do not lead to greater income generation for either men or women, leaving household dynamics largely the same.

There is limited information in the survey about the quality of the bank accounts used (e.g., ease of signing up, account fees, account options, interest rates, and customer support). The limited relationship between bank accounts and women's autonomy may have to do with a low quality of the accounts themselves or some environmental factor limiting their value. Consistent with this explanation, the survey finds low formal loan take-up — just 2% of women.

5.3 Education

There was no test of financial or business literacy in the survey, so secondary education was used as a proxy for information. Increased status and expanded social networks may also play a part in determining the coefficient on secondary education. In addition to any resulting increase in income earning capacity, secondary education appears to add around 15% to the propensity that women participate in household spending decisions or have responsibility for their own spending decisions.

5.4 Major decisions and culture

Most women in my sample do not have any say in major household decisions (i.e., 65%). Major household decisions in PNG have widespread cultural norms associated with them, whereby male heads of household tend to have ultimate control. This is especially the case for large expenditures such as weddings and funerals. The analysis in this paper hints at the prevalence and strength of cultural norms, especially around major decisions. Although income contribution is strongly correlated with involvement in major decisions, the magnitude is around half that of the other decisions and there is no evidence of any relationship with secondary education or bank account ownership.

5.5 Concluding remarks

Autonomy is an important component of women's empowerment. This paper highlights the importance of income contribution to intra-household financial decision-making, where income contribution is a simple dichotomous measure. More granular data on income earned, specifically on the levels and sources, could provide additional insights.

Secondary education had a more modest relationship with participation in household financial decisions, potentially warranting further investigation. I also found no evidence throughout the paper that bank accounts increased female autonomy for the three types of fundamental economic decisions measured. Future research could explore these dynamics further, specifically moving beyond these descriptive findings to unpack the causal mechanisms at work.

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Appendix tables

Table A1: Balance table – respondent participates in household financial decisions

	(1)	(2)	t-test	Normalised
	0	1	Difference	difference
	Mean/SE	Mean/SE	(1)-(2)	(1)-(2)
Owens a bank account dummy	0.250 [0.066]	0.117 [0.020]	0.133**	0.388
Secondary education dummy	0.205 [0.062]	0.148 [0.022]	0.057	0.156
Contributes income to the household dummy	0.682 [0.071]	0.953 [0.013]	-0.271***	-0.965
Age range: 18–34	0.273 [0.068]	0.272 [0.028]	0.000	0.001
Age range: 35–54	0.386 [0.074]	0.467 [0.031]	-0.081	-0.162
Age range: 55+	0.068 [0.038]	0.051 [0.014]	0.018	0.078
Observations	194	107		

The value displayed for t-tests are the differences in the means across the groups.

***, **, and * indicate significance at the 1, 5, and 10% critical level.

Table A2: Balance table – respondent is personally responsible for her own spending

	(1)	(2)	t-test	Normalised
	0	1	Difference	difference
	Mean/SE	Mean/SE	(1)-(2)	(1)-(2)
Owens a bank account dummy	0.128 [0.030]	0.142 [0.026]	-0.014	-0.041
Secondary education dummy	0.136 [0.031]	0.170 [0.028]	-0.034	-0.095
Contributes income to the household dummy	0.840 [0.033]	0.966 [0.014]	-0.126***	-0.447
Age range: 18–34	0.288 [0.041]	0.261 [0.033]	0.027	0.060
Age range: 35–54	0.416 [0.044]	0.483 [0.038]	-0.067	-0.134
Age range: 55+	0.040 [0.018]	0.063 [0.018]	-0.022	-0.100
Observations	125	176		

The value displayed for t-tests are the differences in the means across the groups.

***, **, and * indicate significance at the 1, 5, and 10% critical level.

Table A3: Balance table – respondent is solely or jointly responsible for major household spending decisions

	(1)	(2)	t-test	Normalised
	0	1	Difference	difference
	Mean/SE	Mean/SE	(1)-(2)	(1)-(2)
Owens a bank account dummy	0.119 [0.023]	0.168 [0.036]	0.231	-0.145
Secondary education dummy	0.149 [0.026]	0.168 [0.036]	0.669	-0.052
Contributes income to the household dummy	0.892 [0.022]	0.953 [0.020]	0.069*	-0.219
Age range: 18–34	0.289 [0.033]	0.243 [0.042]	0.396	0.102
Age range: 35–54	0.418 [0.035]	0.523 [0.049]	0.078*	-0.212
Age range: 55+	0.057 [0.017]	0.047 [0.020]	0.713	0.044
Observations	194	107		

The value displayed for t-tests are the differences in the means across the groups.

***, **, and * indicate significance at the 1, 5, and 10% critical level.

Table A4: OLS results

	Participates			Personally responsible			Involved major		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Owns a bank account dummy	-0.088 (0.070)	-0.086 (0.070)	-0.073 (0.077)	0.11 -0.11	0.142 -0.105	0.188 -0.117	0.076 (0.102)	0.070 (0.103)	0.145 (0.112)
Secondary education dummy	0.146** (0.072)	0.138* (0.073)	0.147* (0.080)	0.153 -0.114	0.177 -0.109	0.185 -0.126	-0.013 (0.106)	-0.019 (0.107)	-0.068 (0.116)
Contributes to household income dummy	0.427*** (0.077)	0.447*** (0.079)	0.440*** (0.085)	0.404*** -0.135	0.491*** -0.13	0.350** -0.14	0.197* (0.113)	0.230** (0.117)	0.265** (0.122)
Age range: 18–34 dummy (ref)	–	–	–	–	–	–	–	–	–
Age range: 35–54 dummy	0.040 (0.048)	0.030 (0.048)	0.040 (0.051)	0.066 -0.075	0.038 -0.072	0.03 -0.076	0.085 (0.070)	0.080 (0.071)	0.115 (0.073)
Age range: 55+ dummy	0.105 (0.107)	0.086 (0.107)	0.064 (0.115)	0.132 -0.189	0.102 -0.179	0.014 -0.202	0.052 (0.156)	0.067 (0.157)	0.087 (0.166)
Urban dummy	0.208*** -0.069	0.245*** -0.074	0.021 -0.171	0 -0.109	0.103 -0.11	0.198 -0.266	-0.022 -0.016	-0.024 -0.016	-0.017 -0.017
No. household members	0.004 -0.01	0.003 -0.01	0.004 -0.01	-0.001 -0.016	-0.011 -0.015	-0.004 -0.016	-0.006 -0.034	-0.003 -0.034	-0.005 -0.036
No. working household members	-0.016 -0.021	-0.019 -0.022	-0.029 -0.022	0.008 -0.034	0.01 -0.033	0.003 -0.035	0.042 -0.107	0.036 -0.109	0.083 -0.114
Uses bank account dummy	-0.104 -0.068	-0.102 -0.069	-0.084 -0.072	-0.09 -0.107	-0.034 -0.103	-0.054 -0.112	0.173 -0.113	0.13 -0.114	0.027 -0.125
Self-employment income dummy	0.159** -0.071	0.173** -0.073	0.093 -0.079	-0.071 -0.113	-0.048 -0.108	-0.055 -0.122	0.06 -0.068	0.08 -0.07	0.062 -0.077
Wage income dummy	-0.015 -0.061	-0.008 -0.063	-0.019 -0.071	-0.079 -0.095	-0.003 -0.094	-0.056 -0.11	-0.083 -0.095	-0.098 -0.099	-0.185* -0.112
Secondary education dummy male	-0.101** -0.049	-0.090* -0.05	-0.077 -0.052	-0.033 -0.077	0.006 -0.074	-0.001 -0.08	0.017 -0.077	-0.012 -0.078	0.005 -0.082
Uses bank account dummy male	-0.061 -0.059	-0.061 -0.061	-0.074 -0.066	-0.102 -0.093	-0.07 -0.09	-0.122 -0.102	0.064 -0.093	0.091 -0.095	0.002 -0.104
Age range male 18–34	-0.065 -0.13	-0.07 -0.131	-0.021 -0.136	-0.15 -0.205	-0.191 -0.195	-0.204 -0.211	-0.177 -0.205	-0.163 -0.206	-0.205 -0.215
Age range male 35–54	-0.111 -0.126	-0.117 -0.127	-0.073 -0.13	-0.158 -0.199	-0.194 -0.189	-0.203 -0.202	-0.133 -0.199	-0.13 -0.199	-0.194 -0.206

Table A4: OLS results *(continued)*

	Participates			Personally responsible			Involved major		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Age range male									
55+	-0.207	-0.205	-0.12	-0.024	-0.05	0.027	-0.241	-0.236	-0.299
	-0.136	-0.136	-0.143	-0.214	-0.203	-0.221	-0.214	-0.214	-0.226
IDdist=1									
IDdist=2		-0.114			-0.281**			0.157	
		-0.082			-0.122			-0.128	
IDdist=3		0.033			-0.082			-0.023	
		-0.082			-0.122			-0.128	
IDdist=4		-0.026			-0.047			-0.09	
		-0.067			-0.1			-0.105	
IDdist=5		-0.079			0.437***			0.035	
		-0.065			-0.097			-0.103	
IDdist=6		-0.057			-0.278**			-0.155	
		-0.075			-0.111			-0.117	
IDdist=7		-0.004			0.065			-0.036	
		-0.08			-0.119			-0.125	
IDcu=1									
IDcu=4			0.168			0.103			0.222
			-0.108			-0.167			-0.17
IDcu=5			0.169			0.128			0.196
			-0.105			-0.163			-0.166
IDcu=7			0.17			0.223			0.042
			-0.117			-0.182			-0.186
IDcu=8			0.193			-0.042			0.055
			-0.128			-0.199			-0.203
IDcu=9			0.11			-0.031			0.036
			-0.11			-0.17			-0.173
IDcu=10			-0.028			-0.448			-0.02
			-0.247			-0.383			-0.391
IDcu=11			0.15			0.317*			0.018
			-0.121			-0.187			-0.191
IDcu=12			-0.031			0.089			0.089
			-0.143			-0.222			-0.226
IDcu=14			0.037			-0.074			0.131
			-0.104			-0.161			-0.164
IDcu=15			-0.631*			-0.776			-0.371
			-0.34			-0.528			-0.538
IDcu=16			-0.753**			0.369			-0.446
			-0.329			-0.51			-0.52
IDcu=18			-0.164			-0.420*			-0.044
			-0.145			-0.225			-0.23
IDcu=19			0.087			0.214			0.178
			-0.109			-0.169			-0.173
IDcu=20			-0.03			-0.194			0.106

Table A4: OLS results *(continued)*

	Participates			Personally responsible			Involved major		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
IDcu=24			-0.132			-0.205			-0.209
			-0.045			-0.11			0.420**
IDcu=28			-0.125			-0.193			-0.197
			0.047			-0.027			-0.044
IDcu=29			-0.123			-0.19			-0.194
			0.116			0.265			-0.003
IDcu=31			-0.135			-0.21			-0.214
			0.026			-0.426**			-0.003
IDcu=40			-0.13			-0.201			-0.205
			0.157			0.196			-0.048
IDcu=77			-0.122			-0.189			-0.193
			0.173			0.293			0.026
IDcu=110			-0.122			-0.189			-0.193
			0.182			-0.327			-0.315
IDcu=178			-0.219			-0.339			-0.346
			0.3			-0.079			0.411
IDcu=411			-0.215			-0.333			-0.34
			0.151			0.206			0.189
IDcu=436			-0.123			-0.191			-0.194
			-0.047			0.073			-0.045
IDcu=507			-0.221			-0.342			-0.349
			0.202			-0.393			0.165
IDcu=640			-0.201			-0.312			-0.319
			-0.079			-0.26			0.580***
IDcu=674			-0.132			-0.205			-0.209
			0.148			-0.316			0.207
Regional fixed effects			-0.217			-0.337			-0.343
	None	District	Census Unit	None	District	Census Unit	None	District	Census Unit
Observations	301	301	301	301	301	301	301	301	301