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**What about the Women?**
**Female Headship, Poverty and Vulnerability in Thailand and Vietnam**

**Stephan Klasen, Tobias Lechtenfeld and Felix Povel**

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Wilhelm-Weber-Str. 2 · 37073 Goettingen · Germany
Phone: +49-(0)551-3914066 · Fax: +49-(0)551-3914059

Email: crc-peg@uni-goettingen.de Web: http://www.uni-goettingen.de/crc-peg

# What about the Women?

# Female Headship, Poverty and Vulnerability in Thailand and Vietnam

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## Abstract

This paper investigates whether heterogeneous subgroups of female-headed households are worse off than traditional households headed by men. We analyze the determinants of consumption, shock exposure and vulnerability to poverty. Using unique panel data of over 4000 rural households from Thailand and Vietnam, we find strong signs of heterogeneity among the subgroups of female-headed households. In particular, in both countries *de facto* female-headed households are consumption richer and less vulnerable to poverty than households with a male head. In Vietnam *de jure* female-headed households are consumption poorer and more vulnerable to poverty. In Thailand *de jure* female-headed households do not differ significantly from male-headed households in terms of the analyzed welfare dimensions. These results show how widows and singles in Vietnam are not well protected against uncertainties. The results also indicate that differentiation by subgroups of headship is important for policy targeting and future research. We interpret this as a first step towards a more complete picture of vulnerability of female-headed households in the developing world.

**Keywords.** Gender, Poverty, Shocks, Vulnerability to Poverty

JEL Classification. I32, I 39, O12

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## 1. Introduction

Since the 1990s the poverty status of women is subject to increased attention of economists and policy makers. In 1995 the issue was put on top of the international development agenda at the Fourth World Conference on Women in Beijing (e.g. World Bank, 2001a and 2007). While there is a large literature documenting the disadvantage of women in many aspects of well-being, including education, health, and survival (e.g. World Bank 2001a, Klasen and Wink, 2003), the claim of the feminization of poverty has been harder to substantiate empirically. The literature has particularly focused on the fate of female-headed households where evidence from the industrialized world appeared to point to higher poverty among this group of households. The question then arose how female-headed households fare in developing countries.

Female-headed households in developing countries deserve special attention since they are typically disadvantaged regarding the access to land, labor, credit and insurance markets. Furthermore, they may be discriminated against by cultural norms and suffering from, for example, high dependency burdens and economic immobility. Evidence regarding the poverty status of female-headed households in comparison to households headed by men is, however, ambiguous (e.g. Marcoux, 1999; Chant, 1993; Rosenhouse, 1989). The first purpose of our study is therefore to clarify the picture for rural areas in Thailand and Vietnam where poverty headcounts have been falling dramatically over the last two decades (World Bank, 2008).

But in order to assess the situation of female-headed households in comparison to male-headed ones a static poverty assessment is not sufficient (Buvinic and Gupta, 1997). Even if female-headed households are not poorer, they might be more vulnerable to poverty as they face higher risks and/or have fewer options for ex-ante and ex-post coping strategies. Assertions such as "social relations of gender predict greater vulnerability among women" (Moghadam, 1997) are common in gender related poverty research (see also, for instance, Chant, 2008; Moghadam, 2005; World Bank, 2001a; Bibars, 2001). However, little is known about this issue empirically since relatively few studies focus on vulnerability and almost none of them on this particular point.[1] Therefore, the second purpose of this paper is to shed light on the vulnerability of female-headed households by examining gender related correlates of shock exposure and threats of poverty.

We scrutinize this issue using a unique panel covering some 4400 rural household in Thailand and Vietnam which provides detailed information about, among other, shock occurrences. Accounting for findings that female-headed households constitute a very heterogeneous group (e.g. Chant, 2008)

[1] An exception is, for example, Glewwe and Hall (1998).

we pay special attention to certain types of female headship. More precisely, we differentiate between *de jure* and *de facto* female-headed households, as well as between households led by widows, single women and women whose husband is absent. This study is to our knowledge the first one that provides a thorough empirical assessment of the relative shock exposure and vulnerability of female-headed households.

The paper is structured as follows: Section 2 provides an overview about literature related to female-headed households and their wellbeing compared to male-headed households. In section 3 we focus on concepts and measures of vulnerability issues and discuss why female-headed households may be particularly vulnerable. Section 4 briefly describes gender differences in Thailand and Vietnam before we start our empirical analysis in section 5. In the last section we summarize our results and draw conclusions.

## 2. Female-headed households and poverty

### 2.1 Economic disadvantages faced by female-headed households

At the latest from the 1990s onwards the "feminization of poverty" has been heavily discussed among economists (Chant, 2008). Reasons for an explicitly gender related research are, among others, the observed increase of female-headed households (e.g. Budowski et al., 2002; Moghadam, 1997), as well as the belief that especially these households suffer from the burden of poverty and vulnerability (e.g. Buvinic and Gupta, 1997).

The literature about disadvantages of women in developing countries can broadly be grouped into two strands: one which focuses on gender related differences, i.e. on differences between men and women, in general, and another one which concentrates on the comparison of male and female-headed households. Although in this paper we are concerned with the latter analysis we also partly draw on literature of the former since it provides theoretical reasons and empirical proof of (non-)discrimination relevant for our investigation.[2]

Among disadvantages for women in developing countries the lack of access to markets stand out. First, in many developing countries women have no access to land. Especially for rural households which depend on agriculture land is one of the most important productive assets. Empirical evidence indicates that access to land is positively associated with higher incomes (World Bank, 2007). However, land tends to be distributed unevenly between men and women with the former owning by far the largest share. Deere and Leon (2003), for example, find that in some Latin American

[2] Research regarding gender differences which is not presented here includes, for example, work on discriminating intra-household allocation (e.g. Burgess and Zhang, 2001) or women's lack of voice in the political context (e.g. King et al., 2007)

countries the male share of owners of farm land ranges between 70 and 90 percent. Moreover, female land owners commonly possess less land than their male counterparts.[3] Underlying factors causing this inequality include inheritance and land titling laws in favor of men (King et al., 2007).

Second, women suffer from a limited access to formal credit markets (King et al., 2007). The problem is not so much that they are rejected for loans or are charged higher interest rates. Rather they do not tend to apply for loans because they do not dispose of collateral such as land or other property (e.g. Storey, 2004; Diagne et al., 2000; Ratusi and Swamy, 1999). Husbands or other male relatives may help getting credit by co-signing loans (Fafchamps, 2000). However, this support is by no means a matter of course and much harder to obtain by female-headed households.

Third, insurance markets in (rural areas of) developing countries are – if existing at all – often hardly functioning. While both men and women are affected by such a market failure, the latter are likely to suffer more from it in the absence of a formal pension system and equal property rights. Also, women usually have very limited possibilities to contract health insurance and may get a respective access only "through spouses employed in formal sector jobs" (World Bank, 2001a).

Fourth, women have less access to the labor market than men.[4] Gender discrimination in the labor market is a common phenomenon in both developed and developing countries. But while discrimination in the former is rather reflected in differential wage rates, discrimination in the latter is rather associated with differential access to wage employment (Collier, 1994). Often this is caused by cultural factors such as norms and traditions and not necessarily by gender discrimination in the labor market itself (which also exists). Already during childhood when households invest less in schooling of girls unequal labor opportunities are predetermined (World Bank, 2001a). Later on work of women is frequently confined to the home because of the "social stigma" against (manual) labor outside the household (Goldin, 1994). Other studies pointing at cultural reasons which restrict women's access to wage labor include Kumar et al. (1999), Dunlop and Velkoff (1999), as well as Drèze and Sen (1995). Also, there is another reason why women face limited access to the labor market: Full-time jobs during set hours effectively exclude mothers from employment whereby their confinement to domestic work is perpetuated (World Bank, 2001a). Finally, even if female shares in formal employment are high – as is predominantly the case in East and Southeast Asia – women are paid significantly less than men. This wage differential cannot be explained by worker characteristics such as education and experience (e.g. Klasen, 2006; Horrace and Oaxaca, 2001; Blau and Kahn, 1994 and 1999).

[3] For similar evidence regarding Sub-Saharan Africa see, for example, Doss (2005), Udry (1996), and Quisumbing et al. (2004).
[4] The focus of this paragraph is on wage labor. With regard to self-employment recall that women suffer from a lack of access to land and capital which constitutes a serious obstacle to open up a business (e.g. King et al., 2007; Blackden and Bhanu, 1999; and ILO, 1995).

In addition to the generally gender related economic gap there are disadvantages particular to female-headed households. Most strikingly, households led by women carry a “double day burden” if their heads have to handle domestic work and the role of breadwinner simultaneously (Moghadam, 1997). Consequently, these women suffer from more pronounced time and mobility constraints than others which possibly impacts negatively on income of their households (Buvinic and Gupta, 1997).

Lastly, female-headed households often lack support from both social networks and the state. For example, Bibars (2001) finds that for women in Egypt there is no institutional alternative to a male provider. Chant (2008) underlines that female heads may lack ties with ex-partners' relatives, as well as with their own families and communities. However, female household heads that are married and whose husband migrated may receive adequate remittances preventing them from experiencing destitution (Buvinic and Gupta, 1997).

### 2.2 Ambiguous empirical evidence

Despite the abundance of reasons why female-headed households may suffer more from deprivation, empirical evidence on how they translate into, as well as the gender dimensions of poverty is ambiguous (Chant, 2008). During the 1980s and early 1990s analyses about the “feminization of poverty” have proliferated stating that female-headed households are the poorest of the poor (Chant, 2003). Simultaneously, it was pointed at the increase of the number of female-headed households in many developing countries (United Nations, 1995). Several studies emanating from the United Nations claimed that the share of women among the income poor would range between 60 and 70 percent (e.g. United Nations, 1996; UNDP, 1995).

However, this view was quickly criticized as being unsubstantiated leading Lipton and Ravallion (1995) to conclude that female-headed households are not more likely to be poor than male-headed ones. The same authors find that there is no disproportionate share of women in poor households either. Other prominent studies challenging the existence of a “feminization of poverty” and disapproving related “guesstimates” include Marcoux (1998), Chant (1997), and Kabeer (1996).

Several problems that arise when assessing the relation between headship and poverty cause this ambiguous picture. Results depend on (i) the context, i.e. country, where analyses are conducted, (ii) the type of female-headed household, (iii) the choice and use of equivalence scales, and (iv) the consideration of economies of scale. Buvinic and Gupta (1997) review 61 studies concerned with the poverty status of female-headed households. [5] They state that in 38 of these studies female-headed households are said to constitute a higher share of poor households than male-headed ones.

[5] A broad range of definitions of female-headed households is used in these studies. For a thorough discussion of different types of female-headed households see below.

However, according to 15 studies only certain types of female-headed households are overrepresented among the poor and 8 studies find no evidence that female-headed households are disproportionately among the poor. By contrast, Quisumbing et al. (2001) investigate the poverty status of female-headed households in 10 developing countries using consistent methodologies across countries. Only in two cases they confirm that female-headed households suffer more from poverty than households headed by men. The fact that the poverty situation of female-headed households varies across countries is also underlined by findings from, for example, Lampietti and Stalker (2000), Ye (1998), and Haddad et al. (1996).

Besides country specific contexts, the differentiated picture of gender related poverty research is owed to the heterogeneity of female-headed households. Therefore, in the literature it is increasingly refrained from superficial comparisons between male and female-headed households and switched to the analysis of different types of the latter (Chant, 2008). On a rather aggregated level it is useful to distinguish between *de jure* and *de facto* female-headed households. In case of the former women are the legal and customary heads. Examples are households headed by widows and unmarried, separated or divorced women. The latter have either a self reported female head whose husband is present or, more typically, a self reported male head who is absent for most of the time (Quisumbing et al., 2001). Studies analyzing empirically the difference between *de jure* and *de facto* female-headed households include, for instance, Chant (1997) who finds that in the Philippines *de facto* female-headed households had a higher per capita income than *de jure* female-headed households in 1993.

According to Moghadam (2005) the majority of female heads of household in developing countries are widows followed by divorced or separated women. Widow heads – who mainly live alone or with other elderly family members (King et al., 2007) – are said to be particularly vulnerable to poverty (e.g. World Bank, 2001a; Lampietti and Stalker, 2000; Cox-Edwards 1999). Chen and Drèze (1995) ascertain that in India widowhood is a cause of economic deprivation. Widow headed households tend to have less productive assets and fewer savings than widowers, are less likely to have pension income, and often depend heavily on the economic support of their sons (Chen, 1998). Besides, single mothers have increasingly gained attention from researchers. In comparison to households in which both parents are present they lack an income earning partner and are likely to have to maintain more dependents at the same time (Chant, 2008). Consequently, they are often overrepresented among the poor (e.g. Koc, 1998). However, there are also households headed by women which may fare fairly well. For instance, *de facto* households headed by women whose husband migrated in order to work elsewhere may benefit from regularly sent remittances preventing them from falling into poverty (World Bank, 2001a).

Turning to methodological issues, the use (or neglect) of equivalence scales is crucial for the results of any poverty comparison between female and male-headed households. Female-headed households typically have higher dependency ratios than households headed by men. Hence, poverty of female-headed households tends to be overestimated if consumption or income is measured per capita and not by adult equivalence scales. However, the use of the same adult equivalence scales across different countries may mask significant country specific peculiarities in the consumption needs of children (Quisumbing et al., 2001).[6]

Moreover, results can change significantly as soon as it is accounted for household size. Larger households might be able to satisfy the needs of their members at lower costs by exploiting household specific economies of scale (e.g. Deaton and Paxson, 1998; Lanjouw and Ravallion, 1995). That is, when economies of scales are neglected the contribution of typically smaller households such as female-headed households to overall levels of poverty might be underestimated (Quisumbing et al., 2001). For example, Drèze and Srinivasan (1997) find no evidence suggesting that female-headed households – and particularly households headed by widows – are poorer than male-headed ones if they do not account for economies of scale. However, the incorporation of even fairly small economies of scale in their analysis reveals that poverty rates are relatively high among single widows, widows living with unmarried children, and other female household heads.

Although poverty assessments are ambiguous, it is frequently argued that female-headed households should be targeted by policy interventions because they are assumed to transmit poverty to the next generation. This argument draws on female heads' "double day burden": They have to do domestic work and earn a great share of the household's income which may deter them from adequately supporting their family (Mehra et al., 2000). Thus, children of female-headed households might be more likely to be poor in later stages of their lives (Lagerlof, 2003; Quisumbing et al., 2001).[7] On the other hand, empirical evidence suggests that higher female income shares within a household are associated with higher expenditure shares for investment in human capital of children (e.g. Bussolo et al., 2009; Backiny-Yetna et al., 2009). Therefore, female-headed households might spend more on the welfare of their children than male-headed ones.

Despite the fact that different methods to assess the poverty status of women in comparison to the one of men have been proposed, illustrating gender related poverty differences remains a challenging task. Inter alia, this can be attributed to the fact that consumption is typically measured at the household level without providing any information about the relative welfare of females in

[6] For empirical evidence suggesting less differences in terms of poverty between female and male-headed households when adult equivalence scales are used see, for instance, Louat et al. (1997).

[7] Therefore, Buvinic and Gupta (1997) criticize that "the more sophisticated consumption expenditure measures and adult-equivalence scales underestimate the poverty … [related to] female headship, especially when poverty is measured inter-generationally."

male-headed or males in female-headed households (e.g. Charmes, 2006; World Bank, 2001a). Non-monetary poverty assessments at the individual level can help to circumvent this lack of information. The few studies of this kind investigate, for instance, individuals' food intake or nutrition and find significant differences between men and women in South Asia but little of such evidence in other regions (e.g. Alderman, 2000; Appleton and Collier, 1995).

## 3. Female-headed households and vulnerability

### 3.1 Vulnerability to poverty and downside risk

Even though evidence concerning shares of women among the (monetary) poor is unclear authors like Moghadam (2005) perceive the disadvantaged position of women as being "incontestable". Consequently, the question arises if there are other dimensions of poverty in which women in general and female-headed households in particular are worse off.[8] One such dimension might be the vulnerability of households, i.e. their exposure to adverse events, as well as the threat of poverty they face. In recent years research on the vulnerability of households has become increasingly popular (e.g. Naudé and McGillivray, 2009; Ligon and Schechter, 2003; World Bank, 2001b; Narayan et al., 2000).

Vulnerability is a source of deprivation which may even be interpreted as yet another dimension of poverty (e.g. Cafiero and Vakis, 2006). The exposure to downside risk and the inability to prevent, mitigate, and cope with its impact decreases the wellbeing of households regardless of their current level of material wealth. Ample qualitative and quantitative evidence suggests that particularly poor households in developing countries spend a lot of time and resources on reducing their exposure to such risk (Dercon, 2005).

Once adverse events occur households try to smooth their consumption in an attempt to cope with the shock. Respective literature proliferated during the last twenty years and is surveyed, for instance, in Deaton (1997) and Morduch (2004). Often, however, such smoothing efforts are not successful in keeping consumption levels stable suggesting a lack of adequate risk management strategies at the disposal of households. A common finding in this regard is that wealthier households have less difficulties in smoothing their consumption than relatively poor households (e.g. Jalan and Ravallion, 2001; Fafchamps et al., 1998; Rosenzweig and Wolpin, 1993).

[8] A prominent dimension other than income and consumption analyzed in the context of gender research is time. Women are said to be particularly vulnerable to time poverty since they have to do domestic and reproductive work in addition to their market or non-market productive work (Charmes, 2006). Especially women with a double day burden such as single mothers may suffer from time poverty even if they are not deprived in terms of income and/or consumption (Udry, 1996).

Risk exposure and the inability to cope with adverse events are at the root of empirical evidence on poverty dynamics indicating that the poverty status of many households changes over time. Large proportions of poor households tend to move into and out of poverty. That is, they are exposed to "transitory poverty" (e.g. Dercon and Krishnan, 2000; Jalan and Ravallion, 2000). In contrast to transitionally poor households, there are also households experiencing "chronic poverty" (e.g. Chronic Poverty Research Centre, 2004). Again, this stable poverty status can be explained – at least partly – by vulnerability: Currently poor and risk adverse households apply strategies in order to prevent risks from happening. For instance, they invest in stable, low-return sources of income and not in projects whose outcome is more uncertain. This behavior may perpetuate poverty of households leaving them chronically poor or, in other words, caught in a poverty trap (Chronic Poverty Research Centre, 2008). Moreover, the possibly permanent impact of transitory shocks on, for example, productive assets can cause households to experience long-term poverty (Dercon, 2005).

Rather recently, researchers started to design and empirically apply measures in an attempt to quantify the vulnerability of households:[9] Pritchett et al. (2000) put forward the concept of vulnerability as expected poverty which defines vulnerability as the probability that a household will be below a pre-determined poverty line in future. The concept incorporates the notion of risks that may push a household below the poverty line or keep it there into poverty research. Empirical applications of this concept are found in, inter alia, Christiaensen and Subbarao (2004), Kamanou and Morduch (2004), and Chaudhuri et al. (2002).

The concept of vulnerability as low expected utility introduced by Ligon and Schechter (2003) focuses on "expected utility". Here household's vulnerability equals the difference between household's utility derived from its certainty-equivalent consumption and household's expected utility derived from its current consumption. Positive future outcomes are allowed to compensate negative future outcomes. Vulnerability as low expected utility is empirically quantified by, for instance, Gaiha and Imai (2009), as well as Ligon and Schechter (2003, 2004).

Another approach interprets vulnerability as uninsured exposure to risk (e.g. Townsend, 1994). In its empirical application this concept measures whether (idiosyncratic) income shocks impact significantly on consumption changes. As in the case of vulnerability as low expected utility there is no reference to the poverty line. Vulnerability as uninsured exposure to risk is measured by, for example Gaiha and Imai (2009), Skoufias and Quisumbing (2005) and Amin et al. (2003).

[9] For a more detailed assessment of the concepts of vulnerability as expected poverty, vulnerability as low expected utility, vulnerability as uninsured exposure to risk, and vulnerability to poverty, as well as their empirical applications see Povel (2010).

Building on established axioms from poverty research Calvo and Dercon (2005) design a household specific measure of vulnerability to poverty. It interprets vulnerability as a probability weighted average of future states of the world specific indices of deprivation, i.e. poverty. The measure ranges from zero (not vulnerable) to one (most vulnerable). In a subsequent work Calvo and Dercon (2007) introduce an aggregate measure of vulnerability to poverty which builds on their axiomatic approach from 2005. Calvo (2008) is the first to combine multidimensional poverty with vulnerability research by measuring the vulnerability to consumption and leisure poverty. In our empirical analysis below we apply the measure of Calvo and Dercon (2005) in order to test whether female-headed households are more vulnerable to poverty.

### 3.2 Vulnerability from a gender perspective

Although there is extensive literature on vulnerability, so far there is no or only little focus on the shock and risk exposure of female-headed households. This negligence is even more surprising considering the fact that especially female-headed households are likely to be prone to adverse events (e.g. Chant, 2008; Moghadam, 2005; Buvinic and Gupta, 1997). Lacking access to markets and other disadvantages mentioned above may seriously hamper the risk management capacities of female-headed households (World Bank, 2001a).

A series of studies identify strategies applied by households in developing countries after a risk realizes. These include, for example, asset depletion (Fafchamps et al., 1998), borrowing (Udry, 1995), taking up additional occupations (Kochar, 1995), temporal migration (Lambert, 1994), drawing on governmental insurance schemes and/or informal risk-sharing networks (Townsend, 1994), as well as a change in expenditures at the expense of investment in human capital (Jacoby and Skoufias, 1997). However, when being exposed to an adverse event female-headed households may not be able to apply these strategies because they lack access to (i) certain assets such as land (asset depletion), (ii) credit markets (borrowing), (iii) labor markets (taking up additional occupations) and (iv) insurance markets (drawing on insurance schemes). Furthermore, they dispose of less social capital (informal risk-sharing networks) and are restricted in their mobility (temporal migration). Of the aforementioned examples merely a cut of expenditures for the education of children seems to be possible. Such a coping strategy provides an argument for the likelihood of intergenerational transmission of poverty in female-headed households.

Another important aspect of the impact of risks on female-headed households is that the latter may be formed endogenously as a consequence of the occurrence of the former. This can happen directly if, for example, the male head dies or indirectly if the male head migrates in order to help the household to cope with a shock (Quisumbing et al., 2001).

Conversely, it may also be the case that female-headed households could be less vulnerable. In particular, their lower exposure to markets could shield them from economic risks such as price shocks on the output or input side. Moreover, the endogeneity of female-headed households may be a cause of them being better off. It may, for example, be the case that only women feel secure enough to form their own household if they are able to rely on steady income sources. This may be particularly relevant for households headed by young single women.

Despite the arguments in favor of (and against) female-headed households being more vulnerable than their male-headed counterparts, empirical work regarding this matter is scarce.[10] However, as we have seen in the case of poverty plausible reasons do not necessarily imply that empirical evidence is unambiguous. Therefore, it is all the more important to empirically test whether assumptions that female-headed households are more prone to shocks than male-headed ones can be substantiated or not.

## 4. Gender differences in Thailand and Vietnam

We focus our empirical analysis on Thailand and Vietnam, two countries which experienced profound economic transitions, constantly high growth rates, as well as great success in poverty reduction during the last decades. On the other hand, both countries have been exposed to the Asian crisis during the second half of the 1990s (particularly Thailand), suffer regularly from natural disasters (particularly Vietnam), and, more recently, experience food price shocks and the global economic slowdown (World Bank, 2009).[11] In addition to idiosyncratic risks at the household level this volatile economic environment renders the empirical analysis of poverty and vulnerability particularly relevant for Thai and Vietnamese households.

The review of country-specific literature reveals that gender differences in terms of poverty and opportunity seem to be less pronounced in Thailand and Vietnam than elsewhere. For example, Nguyen et al. (2007) find for Vietnam that sex of household head is not correlated with the income quintile the respective household belongs to. Also, between 1992 and 1998 poverty reduction was more successful in the case of female- than in case of male-headed households, which is mostly due to the high share of female-headed households living in urban areas (Glewwe et al., 2002). Moreover, gender equality in gross enrollment rates which was already quite advanced in 1985 further improved during Vietnam's economic transition. (World Bank, 2001a). Finally, Vietnamese

[10] Exceptions include, on the one hand, Glewwe and Hall (1998) who find that female-headed households in Peru are not disproportionally vulnerable to macroeconomic shocks and, on the other hand, Aliber (2003) who states that female-headed households are overrepresented among the chronically poor in South Africa.

[11] Other rather country-specific shocks include political turmoil in Thailand and the overheating of Vietnam's economy in late 2007 (World Bank, 2009).

women are overrepresented in nonagricultural wage work mainly due to their high employment shares in manufacturing industries (World Bank, 2007).

However, the country seems to be well suited for an analysis of potentially marginalized and highly vulnerable groups such as female-headed households: First, the current global crisis is likely to affect especially export oriented manufacturing industries wherefore women might be more vulnerable to it than men. Second, a great deal of poverty reduction occurred in urban areas – but what happened to rural (female-headed) households? Third and related to the preceding point, Vietnam's economic development is accompanied by increasing levels of inequality between rural and urban areas (e.g. Nguyen et al., 2007).

In Thailand, gender gaps seem to be rather small, too. Prior to the Asian crisis in 1997 the share of women employed in the industrial and service sector increased steadily (World Bank, 2001a). When the crisis materialized male employment was affected more severely than female employment because most jobs were lost in the male-dominated construction sector. Also, men's wages were hit (slightly) harder than the ones of women during the crisis (Behrman and Tinakorn, 1999). However, Deolalikar (2002) reveals that residence in female-headed households is associated with a higher incidence of poverty. Given this finding and the aforementioned volatile economic and political environment also Thailand is an interesting study site for the analysis of gender differences in terms of poverty and vulnerability.

## 5. Empirical analysis

### 5.1 Data

Our empirical analysis relies on a household panel survey with a focus on household dynamics and vulnerability conducted in two consecutive years in 2007 and 2008. Data stems from some 4400 households in six rural provinces in Thailand and Vietnam. These include the Thai provinces of Buriram, Ubon Rachathani and Nakhon Phanom and the Vietnamese provinces of Ha Tinh, Thua Thien-Hue and Dak Lak. The provinces are predominantly rural and rank in the lowest income quintile in each country.

The sample of households is selected via a three-stage cluster-sampling procedure. The six provinces serve as strata. In each of them sub-districts are selected with a probability proportional to their number of households. Special attention is paid to population density in order to ensure that densely, as well as sparsely populated sub-districts are covered adequately, leading to slight oversampling of the latter. Within each sub-district two villages are drawn with a probability

proportional to their number of households. In a last stage ten households from each village are randomly selected for the sample.

The survey questionnaire covers information about (i) household member characteristics such as demographics, education and health; (ii) shocks and risks; (iii) agriculture; (iv) off-farm and self-employment; (v) borrowing, lending, public transfers and insurance; (vi) expenditures; (vii) assets; and (viii) housing conditions. Especially the shock section of the questionnaire which addresses numerous income, health and social events experienced by households is crucial to our analysis. Among others, it aims at shedding light on the severity of adverse events by asking about their impact on income, assets and additional expenditures. The shock sections from both waves enable us to quantify ex-ante correlates (from 2007) of shock exposure (as recorded in 2008) of households.

### 5.2 Methodology

In the empirical part of our study we examine whether female-headed households are consumption poorer and more vulnerable than households headed by men in rural Thailand and Vietnam. More specifically, we analyze country specific correlations between female headship and the dependent variables consumption, shock exposure, shock severity and vulnerability to poverty.

Each dependent variable is regressed on three levels of disaggregation of our headship indicator, and a list of controls. Beginning with the most aggregate measure of level of headship is a binary variable that equals one if the household head is female and zero otherwise. Next we differentiate between *de jure* and *de facto* female-headed households. In the third specification we further break down the headship indicator into households whose female heads are widows, singles (*de jure*) or have an absent husband (*de facto*). This set up allows us to reveal possible heterogeneous effects between different subgroups of female-headed households.

Moreover, each specification consists of location fixed effects to control for unobserved spatial heterogeneity and a list of covariates describing the household :[12] Household size in adult equivalents accounting for economies of scale; dependency ratio; an index constructed with the principle components of the quality of housing; the logged size of land holdings; non-exclusive dummies indicating whether the household is engaged in non-farm activities, the crop sector or the livestock sector. For the household head we include education measured as highest completed school level and nonlinear age. We expect household size and the dependency ratio to be negatively correlated with per adult equivalent consumption but positively with shock exposure and vulnerability. That is because larger households with a relatively high share of dependent members

[12] When investigating the correlates of shock severity we additionally include shock type dummies (see below).

are more likely exposed to health shocks, for example. The housing index approximates wealth and should be positively associated with consumption but negatively with shock exposure and vulnerability. Since land holdings also reflect wealth we presume that their correlation with consumption is positive. With respect to shock exposure and vulnerability the direction of this correlation is a priori unknown because larger land holdings may increase exposure to agricultural and climatic shocks, but can improve households' mitigation and coping capacities. The non-exclusive dummies for economic activities control for the income stream of households which we expect to consume less when being engaged in agriculture. Regarding vulnerability the direction of the correlation may run in both directions since income diversification can be an efficient strategy to smooth consumption. However, a larger income stream also results in more income sources being at risk of experiencing a shock. Finally, household head's education and age are expected to be positively associated with consumption and negatively with vulnerability because better educated and more experienced heads are likely to generate higher incomes and manage risks better. These additional control variables decrease any bias of female headship dummies due to omitted variables. Whenever possible and suggested by the Hausman-Test we also test the robustness of our results by using household fixed-effects that control for unobserved confounders which are constant over time.[13]

Our first dependent variable is the log of per adult equivalent (World Bank scale) consumption per day of household $i$ ($ln\ (cons)_i$; in USD PPP) which is calculated assuming economies of scale of 0.8 within each household.[14] By choosing this measure of consumption we account for systematic differences between female- and male-headed households that may bias our results and are discussed above. We pool observations from 2007 and 2008 and run the following OLS regression separately for each country:

(1) $$ln\ (cons)_i = \alpha + \beta * FHH'_i + \gamma * X'_i + \varepsilon_i$$

where $FHH'_i$ denotes a vector of dummies for different types of female headship and $X_i^{'}$ is a vector including village dummies, household characteristics and a time dummy. $\varepsilon_i$ is a random error assumed to be independent and identically distributed. We account for survey design, report robust standard errors and test whether female headship dummies are jointly significant. $\beta$ is the coefficient of interest and indicates whether headship is significantly correlated with consumption. In addition, the Hausman test allows us to determine whether we can exploit the panel structure of our data

[13] However, the results of the fixed-effects estimations should be interpreted with caution because there is only little within household variation of female headship status over time (see below). That is, in the case of most observations female headship dummies constitute a household fixed effect.

[14] Note that for Thailand and Vietnam there are no country specific equivalence scales.

further via fixed- or random-effects. Depending on its results we estimate correlates of consumption using one of the two techniques.

Second, we examine the shock exposure of female-headed households by estimating the probability that household $i$ experiences an adverse event between 2007 and 2008 ($Pr(shock_{i0} = 1)$). We assume our dependent variable to be a function of female headship dummies ($FHH'_{i-1}$), district dummies and household characteristics ($X'_{i-1}$) from 2007:

(2) $$Pr(shock_{i0} = 1) = f(FHH'_{i-1}, X'_{i-1})$$

We use a probit model, account for survey design and report marginal effects, as well as robust standard errors. Again we investigate whether female headship dummies are jointly significant. By regressing shock dummies on covariates that are measured before the adverse event materializes we avoid problems of reverse causality.

Third, we analyze whether female-headed households tend to suffer from more severe shocks than male-headed households. For this purpose we use the subsample of households that experienced a shock between 2007 and 2008. Using a Tobit model we estimate correlates of income and asset losses, as well as additional expenditures that are triggered by adverse events. We opt for this estimation technique because shocks may result in, for example, negative additional expenditures which are censored at zero in our data. The corresponding equation is specified as follows:

(3) $$loss_i = \beta * FHH'_{i-1} + \delta * shock\_type'_i + \gamma * X'_{i-1} + \varepsilon_i \quad \text{if} \quad loss_i^* > 0$$

$$loss_i = 0 \quad \text{if} \quad loss_i^* \leq 0$$

$loss_i$ represents income loss, asset loss or additional expenditures of household $i$ due to shocks between 2007 and 2008. $loss_i^*$ is the actual, in case of a negative value unobserved loss of the household. $FHH'_{i-1}$ is a vector of female headship dummies and $X'_{i-1}$ a vector of village dummies and household characteristics from 2007. We also include shock type dummies ($shock\_type'_i$) to control for the different nature of shocks.[15] Again, we account for survey design, report robust standard errors, rely on lagged explanatory variables and test for joint significance of female headship dummies.

Equation two measures the probability that a household experiences a shock, equation three the impact of such events on different welfare dimensions. However, in order to holistically assess the vulnerability of female-headed households we have to use dependent variables that combine both

[15] The shock type dummies include market, agricultural supply, health and social shocks.

shock exposure and shock severity. Therefore, we calculate a household specific measure of vulnerability to poverty ($VTP_i$) as proposed by Calvo and Dercon (2005) and shown in equation four:

(4) $$VTP_i = 1 - \left(\sum_{j=1}^{N_i} p_{ij} \times x_{ij}{}^{\alpha}\right), \quad \text{with}$$

$$0 \leq x_{ij} \leq 1, \qquad \sum_{j=1}^{N_i} p_{ij} = 1 \quad \text{and} \quad 0 \leq \alpha \leq 1.$$

$p_{ij}$ denotes the probability of state of the world $j$ to occur and $x_{ij}$ is a state specific degree of deprivation which equals $\frac{\tilde{y}_{ij}}{z}$. $\tilde{y}_{ij}$ is a censored outcome measure. That is, all outcomes where $y_{ij}$ is above the poverty line $z$ are censored at $z$ and consequently do not change the vulnerability measure. $VTP_i$ ranges between zero and one. There is a total of $N_i$ possible states of the world. The closer (further away) $\alpha$ moves to (from) one the less (more) risk aversion is assumed. We predict district specific probabilities, as well as households specific severities of different states of the world. The product of these predictions is used to calculate $VTP_i$. $\alpha$ is set equal to 0.5 and USD PPP 2 per capita and day defined as poverty line. Using observations from both 2007 and 2008 in a pooled sample we run OLS regressions of the following type separately for each country:

(5) $$VTP_i = \alpha + \beta * FHH'_i + \gamma * X_i' + \varepsilon_i$$

where $FHH'_i$ is a vector of dummies for different types of female headship and $X_i'$ is a vector including village dummies and household characteristics. $\varepsilon_i$ is a random error assumed to be independent and identically distributed. We account for survey design, report robust standard errors and test the female headship dummies for joint significance. $\beta$ indicates whether female headship is significantly correlated with vulnerability to poverty. Furthermore, with the help of the Hausman-Test we check whether our data is rather suited for a random- or a fixed-effect model. We estimate the type of model that is suggested by the result of the test.[16]

### 5.3 Results

*Descriptive statistics – composition of households*

[16] We also quantify perceived vulnerability to downside risk ($VTR_i$) as proposed by Povel (2010). This measure assigns an index of deprivation $d_{hi}$ – with zero implying no deprivation and one implying the highest possible deprivation – to every state of the world $j$ a household $i$ possibly experiences in the future. Every index of deprivation is weighed with its probability of occurrence $p_{ij}$. Thus, the vulnerability of a household equals:

$$VTR_i = \sum_{j=1}^{Ni} (dij^{\alpha} \times pij), \quad \text{with} \quad 0 \leq dij \leq 1 \quad \text{and} \quad \sum_{j=1}^{Ni} pij = 1.$$

$\alpha$ is a parameter measuring risk attitudes. Assuming risk-aversion we set $\alpha$ equal to two. Perceived vulnerability to downside risk differs from vulnerability to poverty in the choice of the relevant benchmark: The latter uses the poverty line while the former relies on the current level of wellbeing. In our analysis perceived vulnerability to downside risk relies on subjective risk perception of households regarding twelve different adverse events in 2008. Using OLS we estimate for each country:

$$VTR_i = \alpha + \beta * FHH'_i + \gamma * X_i' + \varepsilon_i$$

where the entire econometric setup is the same as in equation five (see also foodnote 22).

As table 1a indicates there are 451 (20.8% of all Thai households) female-headed households in Thailand in 2007.[17] Of these 359 (79.6%) households are *de jure* and 92 (20.4%) are *de facto* female-headed. Disaggregating the subgroups even further we see that *de jure* female-headed households are made up of 298 (83.0%) widow headed and 61 (17.0%) single (unmarried or divorced) female-headed households. The subgroup of *de facto* female-headed households counts 92 observations and consists entirely of households in which husbands of female heads are absent. In Vietnam there are less female-headed households: 323 or 15.1% of all Vietnamese households belong to this category. Of the 265 (81.4% of all Vietnamese female-headed households) *de jure* female-headed households in Vietnam 202 (76.0%) are headed by a widow and 63 (24.0%) by a single female. In 58 households husbands of female heads are absent.

In 2008 we find 420 female-headed households in the Thailand data, which equals 19.8% of the Thai sample (table 1b). This modest decrease in female headship is partly driven by sample attrition which also reduces the number of male-headed households over time. The composition of female headed households remains unchanged. The majority are *de jure* (81.4%) female heads. Widowed heads constitute the biggest subgroup of female-headed households in Thailand.

In contrast, the number of female-headed households in Vietnam increases to 334 (15.8% of Vietnam sample) in 2008. The composition of female-headed households remains largely unchanged with 80.3% being *de jure* female-headed out of which 204 (75.8%) have widowed heads. In other words, in both countries the majority of female-headed households are widow-headed. Also, the share of *de facto* female-headed households is similar across space (between Thailand and Vietnam) and time (2007 and 2008) and ranges between 18 and 20%. In 2008 the total number of observations is only slightly below the one in 2007 – the Thai sample decreases by 54 (-2.5%), the Vietnamese sample by 46 observations (-2.1%) – suggesting no selection problems due to sample attrition.

*Correlation between consumption and female headship*

Table 2 shows the result of pooled OLS regressions which measure the country specific correlation between consumption and female headship, as well as other covariates. Summary statistics of the covariates by household type are provided in the appendix. We find that Thai female-headed households are significantly consumption richer than their male-headed counterparts (column 1). The respective coefficient is significant at the 5%-level. Consumption of female-headed households is on average 6.7% higher than consumption of other households.[18] By contrast, female-headed households in Vietnam are on average poorer than male-headed ones although this difference is statistically not distinguishable from zero (column 2). Splitting the female headship dummy into *de*

[17] Note that it is accounted for survey design whenever percentage values are calculated.
[18] Following Halvorsen and Palmquist (1980) we transform the point estimate via [exp(beta)-1]*100 to obtain the percentage difference.

*facto* and *de jure* provides a richer picture (columns 3 and 4): The Thai result is driven by *de facto* female-headed households who consume on average 19.3% more than male-headed households (significant at 1%-level). The overall insignificant difference between both household types in Vietnam is due to the fact that *de facto* female-headed households consume significantly more (20.8%) and *de jure* female-headed households significantly less (-9.2%) than male-headed ones. The latter result can be attributed to both widows and single female-headed households whose consumption is on average significantly below the consumption of male-headed households (column 6). The relatively high consumption of *de facto* female-headed households in both countries can most likely be ascribed to the fact that they receive substantial remittances from their migrated husbands.[19]

The other covariates enter the regressions as expected:[20] Household size and dependency ratio are associated with significantly lower consumption, the education and age of household heads with significantly higher consumption. The correlation between the age of household heads and consumption is non-linear as is indicated by the coefficient of squared age of household heads that is significant and negative. The coefficients of the wealth proxies housing index and logged land holdings are significant and positive. Households who receive income from the non-farm sector are on average significantly richer than households who do not, whereas households engaged in cropping are significantly poorer. Being engaged in the livestock sector is associated with lower levels of consumption in both countries though this correlation is not significant across all specifications. The positive and significant time dummy suggests a very strong growth of consumption over time of around 20% (!) in both countries.

*Descriptive statistics – shock incidence*

After having established the correlation between different types of female headship and consumption we turn to the shock exposure of households. Table 3 shows that the incidence of adverse events differs between both countries: The 66.5% of Vietnamese households that report an adverse event exceed the 46.6% of Thai households that are shock affected. Generally, agricultural supply shocks which include, among others, adverse weather events such as storms and droughts are most common in both countries (28% affected households in Thailand, 51% in Vietnam). This suggests that especially climatic volatility poses a serious threat to the wellbeing of households. Health shocks are also pronounced in our sample with 16.7% of Thai and 23.9% of Vietnamese households being affected. The high incidence of health related hazards is mainly driven by illness of

[19] The correlations between female headship and consumption are not robust to the inclusion of household fixed effects which are suggested by results from the Hausman-Test (not reported). However, since female headship dummies hardly change over time (see tables 1a and 1b) they themselves can be considered to be household fixed effects why they (non-surprisingly) lose their significance.

[20] Results presented in this paragraph hold across all specifications of table 2 if not stated otherwise.

a household member. This result is broadly in line with Wagstaff and Lindelow (2010) who find that in neighboring Laos illnesses are the most common type of (not-aggregated) shocks. Market shocks such as price shocks and job loss play a more important role in Thailand (incidence of 12.7%) than in Vietnam (2.6%). This finding may reflect that Thai village economies in our sample are economically more diversified than Vietnamese ones why they have more non-agricultural income sources at risk. The share of households suffering from social shocks is similar in both countries (7.5% in Thailand and 6.3% in Vietnam).

*Correlation between shock probability and female headship*

In order to further scrutinize these insights we run probit regressions with a depend variable that equals one if the observed household experiences any shock between 2007 and 2008 and zero otherwise (table 4). All marginal effects of female-headed household dummies are positive suggesting that these types of households tend to be more exposed to shocks on average when it is controlled for other observables. However, none of the respective variables is significant. Also the tests for joint significance fail to reject the null hypothesis that the female headship dummies are jointly insignificant (bottom row).

Significant and positive correlates of the dependent shock dummy are household size in Thailand, the crop sector dummy in Vietnam, as well as logged land holdings in both countries. That is, land seems proxy for the amount of planted crops, as opposed to wealth. Many planted crops may render households more susceptible to events such as crop pests and bad weather. This would also help to explain the positive association between engagement in the crop sector and shock exposure in Vietnam. In both countries households headed by an individual with tertiary education are significantly less likely hit by a shock than households with a head with no education. Finally, wealth in Vietnam, as measured by the housing index, is associated with significantly less exposure to adverse events.

We also run regressions as in table 4 for modified dependent variables capturing only income, market, agricultural supply, health, and social shocks, respectively (results not reported). The coefficients of female headship dummies are largely insignificant in these regressions. Only in Vietnam *de facto* female-headed households are significantly and around 7% more likely to be hit by a social shock. This result is likely to be driven by migrated husbands that stop sending remittances to their wives at home. Moreover, we interact the *de facto* headship dummy with a dummy equal to one if the husband migrated far away (i.e. at least into another province; results not reported). In this additional specification neither the female-headed household dummies nor the interaction terms are

significant. All in all we do not find a clear pattern which suggests that households with a female head are systematically more prone to shocks than male-headed households.

*Correlation between shock severity and female headship*

Turning to the severity of adverse events that materialized between 2007 and 2008 we find different results across countries and types of female-headed households. Table 5 shows marginal effects from a tobit regression of logged asset loss in USD PPP on our standard covariates from 2007 and non-exclusive shock groups dummies. In Thailand losses of female-headed households are not significantly different from losses of male-headed households. By contrast, in Vietnam households led by women lose significantly more. This is driven by *de facto* female-headed households. The coefficient of the corresponding dummy is positive and significant at the 5%-level. It contributes to the joint significance of female headship dummies in columns 2 and 4. The result gains importance when we consider the argument that the loss of productive assets may be at the root of long term poverty (e.g. Dercon, 2005). However, we do not know what kind of assets households lose. Also, *de facto* female-headed households in Vietnam are relatively rich on average why chronic poverty poses an unlikely threat to many of them (see table 2 and below).

Agricultural supply, health and social shock dummies are significant and positive across all specifications. Their point estimates indicate that in both countries social shocks inflict the largest losses followed by agricultural supply and market shocks. Vietnamese households engaged in the crop sector lose significantly less assets due to a shock most likely because they have less to lose than richer non-farm households.[21] Finally, the correlation between education of household head and shock severity is negative and significant in the case of the Thai middle school education, as well as the Vietnamese tertiary education dummy.

We also run tobit regressions of the same type with logged income loss and additional expenditures in USD PPP as dependent variables (results not reported). While *de facto* female-headed households in Vietnam lose significantly more assets due to shocks, their Thai counterparts lose significantly more income. This correlation is significant at the 5%-level, too. In terms of extra expenditures households headed by (different types of) women are not significantly worse off than male-headed households. Overall we find statistical evidence suggesting that shocks experienced by *de facto* female-headed households are relatively severe. Since this type of household is on average richer than others (see table 2) the result is probably caused by the fact that *de facto* female-headed households have less need to mitigate the negative consequences of shocks.

[21] Recall that results from table 2 suggest that Vietnamese households engaged in the crop sector are significantly consumption poorer than the ones not engaged in this sector.

*Correlation between vulnerability to poverty and female headship*

Next we analyze correlates of vulnerability to poverty in country specific pooled OLS regressions.[22] In Thailand female-headed households are on average not statistically different from male-headed ones (table 7). However, when we disaggregate the headship dummy into *de jure* and *de facto* we see that the latter are significantly less vulnerable to poverty (at the 5%-level). This is in line with results from table 2 which suggest that *de facto* female-headed households are consumption richer than their male-headed counterparts. Households headed *de facto* by a woman are on average sufficiently high above the poverty line to protect themselves from the threat of poverty. This rational also serves to explain the significant and negative (positive) association between *de facto* (*de jure*) female-headed households and vulnerability to poverty in Vietnam. The positive correlation of vulnerability and *de jure* female-headed households is mainly driven by single female heads whose coefficient is positive and significant at the 5%-level.[23]

The other covariates in table 6 exhibit largely plausible correlations with vulnerability to poverty: The coefficients of household size and dependency ratio are significant and positive across all specifications. By contrast, education of the household head, wealth approximated by both housing index and land holdings, as well as the time dummy are generally associated with significantly less vulnerability. Furthermore, being engaged in the crop sector (non-farm sector) is positively (negatively) correlated with the outcome variable in Vietnam.

## 6. Conclusion

Female-headed households are often thought to be disadvantaged regarding all sorts of market access, discriminated against by cultural norms and suffering from high dependency burdens, economic immobility and the "double day burden" of the women heading them. Despite such assertions research regarding the relative poverty status of female-headed households is inconclusive and there is little empirical evidence regarding their vulnerability. We aim at contributing to the discussion by scrutinizing whether female-headed households from rural Thailand and Vietnam (i) consume less, (ii) are more exposed to shocks, (iii) suffer from more severe shocks,

[22] Note that we also calculate household specific perceived vulnerability to downside risk as in Povel (2010; see also foodnote 16) and regress it on the benchmark regression used throughout the paper. Neither in Thailand nor in Vietnam female-headed households differ significantly from households headed by men in terms of perceived vulnerability to downside risk. Merely the *de facto* female-headed household dummy is significant and negative at the 10%-level in Vietnam. However, female headship dummies in this specification are not jointly significant.

[23] The correlations between female headship and consumption are tested for their robustness by the inclusion of household random effects in Thailand and household fixed effects in Vietnam which are suggested by results from the Hausman-Test (not reported). In the Thai case random effects confirm the results from the pooled OLS regressions. The *de facto* female-headed household dummy is significant at the 10%-level and the point estimate remains virtually unchanged. In Vietnam results from the fixed effects model are only partly in line with the pooled OLS model. On the one hand, the coefficient of *de facto* female-headed household variable is significant at the 10%-level and negative. On the other hand, the *de jure* female-headed and single-headed household dummies lose their significance. As already mentioned above (foodnote 19) the headship within a household only rarely changes between 2007 and 2008 why we would expect that household fixed effects at least partly soak up the significance of headship dummies.

(iv) and are more vulnerable to poverty than male-headed households. In order to put emphasis on the heterogeneity of households headed by women our analysis differentiates between *de jure* and *de facto* female-headed households. By distinguishing between households headed by singles, widows, as well as women whose husband is absent we disaggregate female-headed households even further. Thus, we are able to reveal systematic differences within this group of households.

We find that unlike types of female-headed households are indeed very different from each other in terms of poverty and vulnerability. In fact, merely regarding shock exposure all sorts of households headed by women are similar – namely insignificantly more likely to experience a shock than male-headed households. However, *de facto* female-headed households in Thailand and Vietnam are *better* off than male-headed ones. The *de facto* group is less vulnerable to poverty and on average about 20% consumption richer than households headed by men. This result is in accordance with other studies suggesting that *de facto* female-headed households are relatively wealthy, possibly due to remittances (e.g. Chant, 1997, and World Bank, 2001a). Their susceptibility to more severe adverse events, such as asset loss in Vietnam and income loss in Thailand, is most likely a consequence of more wealth to lose and less need to mitigate or cope with the impact of a shock.

In contrast, *de jure* female-headed households are *worse* off than male-headed households – and consequently than *de facto* female-headed households – in Vietnam. They are consumption poorer and more vulnerable to poverty. The former difference is due to both widow- and single-headed households whereas the latter is mainly driven by single-headed households. Nonetheless, Vietnamese *de jure* female-headed households do not tend to lose more due to adverse events than their male-headed counterparts. That is, contrary to *de facto* female-headed households they do not seem to dispose of more wealth to lose or have less need to cope with the consequences of a shock. *De jure* female-headed households in Thailand differ from the ones in Vietnam because they are neither poorer nor more vulnerable than the male-headed households in their country. That is, with the exception of *de jure* female-headed households in Vietnam our results contradict theoretical considerations and empirical findings suggesting that female-headed households in general are poorer and more vulnerable (e.g. Chant, 2008; Moghadam, 2005; Buvinic and Gupta, 1997).

All in all, we do not identify an obvious need for targeting all types of female-headed households with poverty and vulnerability reducing policies in rural Thailand and Vietnam. However, especially households headed by widows and unmarried women in Vietnam deserve attention. Future research on poverty and vulnerability of female-headed households is well advised to account for different types of headship. Since we rely on data from two countries that are said to suffer relatively little from gender discrimination we would also welcome work that scrutinizes the external validity of our results.

**Table 1a: Headship and sample size – wave 1**

| Country | Female | | | Male |
|---|---|---|---|---|
| Thailand | 451 | | | 1724 |
| | 20.8% | | | 79.2% |
| Vietnam | 323 | | | 1867 |
| | 15.1% | | | 84.9% |
| | **De Jure** | | **De Facto** | |
| Thailand | 359 | | 92 | |
| | 79.6% | | 20.4% | |
| Vietnam | 265 | | 58 | |
| | 81.4% | | 18.6% | |
| | **Widow** | **Single** | **Absent Husband** | |
| Thailand | 298 | 61 | 92 | |
| | 83.0% | 17.0% | 100.0% | |
| Vietnam | 202 | 63 | 58 | |
| | 76.0% | 24.0% | 100.0% | |

Note: Percent by subgroup; accounted for survey design

**Table 1b: Headship and sample size – wave 2**

| Country | Female | | | Male |
|---|---|---|---|---|
| Thailand | 420 | | | 1701 |
| | 19.8% | | | 80.2% |
| Vietnam | 334 | | | 1810 |
| | 15.8% | | | 84.2% |
| | **De Jure** | | **De Facto** | |
| Thailand | 342 | | 78 | |
| | 81.4% | | 18.6% | |
| Vietnam | 267 | | 67 | |
| | 80.3% | | 19.7% | |
| | **Widow** | **Single** | **Absent Husband** | |
| Thailand | 289 | 53 | 78 | |
| | 84.5% | 15.5% | 100.0% | |
| Vietnam | 204 | 63 | 67 | |
| | 75.8% | 24.2% | 100.0% | |

Note: Percent by subgroup; accounted for survey design

**Table 2: Correlates of Consumption (Pooled Panel)**

Outcome ln(Consumption)

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| OLS | Female Head | | De Facto vs. De Jure | | FHH Subgroups | |
| | Thailand | Vietnam | Thailand | Vietnam | Thailand | Vietnam |
| Female Head | 0.065** | -0.036 | | | | |
| | (0.0253) | (0.0286) | | | | |
| De Facto FHH | | | 0.177*** | 0.189*** | | |
| | | | (0.0412) | (0.0564) | | |
| De Jure FHH | | | 0.035 | -0.097*** | | |
| | | | (0.0300) | (0.0312) | | |
| FHH, absent husband | | | | | 0.178*** | 0.184*** |
| | | | | | (0.0411) | (0.0562) |
| FHH, widow | | | | | 0.029 | -0.057* |
| | | | | | (0.0327) | (0.0319) |
| FHH, single | | | | | 0.066 | -0.222*** |
| | | | | | (0.0518) | (0.0578) |
| HH Size (Adult Equivalents) | -0.139*** | -0.152*** | -0.137*** | -0.153*** | -0.137*** | -0.154*** |
| | (0.0142) | (0.0127) | (0.0142) | (0.0126) | (0.0141) | (0.0125) |
| Dep. Ratio | -0.049*** | -0.027** | -0.053*** | -0.033** | -0.053*** | -0.032** |
| | (0.0128) | (0.0127) | (0.0130) | (0.0131) | (0.0130) | (0.0130) |
| Head: Primary Education | 0.082** | 0.072*** | 0.077** | 0.060** | 0.077** | 0.062** |
| | (0.0315) | (0.0267) | (0.0310) | (0.0271) | (0.0309) | (0.0270) |
| Head: Secondary Education | 0.216*** | 0.196*** | 0.214*** | 0.183*** | 0.214*** | 0.186*** |
| | (0.0507) | (0.0298) | (0.0506) | (0.0296) | (0.0506) | (0.0295) |
| Head: Upper Secondary Education | 0.373*** | 0.297*** | 0.373*** | 0.282*** | 0.372*** | 0.283*** |
| | (0.0498) | (0.0360) | (0.0500) | (0.0358) | (0.0500) | (0.0360) |
| Head: Tertiary Education | 0.650*** | 0.504*** | 0.648*** | 0.486*** | 0.646*** | 0.486*** |
| | (0.0664) | (0.0411) | (0.0661) | (0.0409) | (0.0661) | (0.0410) |
| Age of Head | 0.009* | 0.024*** | 0.011** | 0.026*** | 0.011** | 0.026*** |
| | (0.0050) | (0.0047) | (0.0051) | (0.0046) | (0.0051) | (0.0046) |
| Age Square | -0.000** | -0.000*** | -0.000*** | -0.000*** | -0.000** | -0.000*** |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| Housing Index | 0.154*** | 0.147*** | 0.152*** | 0.146*** | 0.153*** | 0.146*** |
| | (0.0103) | (0.0203) | (0.0102) | (0.0203) | (0.0102) | (0.0203) |
| Ln(Land) | 0.108*** | 0.094*** | 0.109*** | 0.092*** | 0.109*** | 0.090*** |
| | (0.0099) | (0.0115) | (0.0099) | (0.0115) | (0.0099) | (0.0115) |
| Non-Farm Sector | 0.036* | 0.064*** | 0.042** | 0.073*** | 0.042** | 0.071*** |
| | (0.0195) | (0.0182) | (0.0194) | (0.0188) | (0.0195) | (0.0185) |
| Crops Sector | -0.104*** | -0.232*** | -0.107*** | -0.228*** | -0.107*** | -0.229*** |
| | (0.0325) | (0.0400) | (0.0324) | (0.0404) | (0.0324) | (0.0401) |
| Livestock Sector | -0.037 | -0.052** | -0.036 | -0.053** | -0.036 | -0.057** |
| | (0.0264) | (0.0263) | (0.0262) | (0.0266) | (0.0262) | (0.0264) |
| Time Dummy | 0.185*** | 0.191*** | 0.185*** | 0.189*** | 0.185*** | 0.189*** |
| | (0.0158) | (0.0151) | (0.0157) | (0.0150) | (0.0157) | (0.0151) |
| Constant | 7.698*** | 7.344*** | 7.644*** | 7.304*** | 7.641*** | 7.304*** |
| | (0.1378) | (0.1245) | (0.1408) | (0.1242) | (0.1409) | (0.1245) |
| Observations | 4,226 | 4,260 | 4,226 | 4,260 | 4,226 | 4,260 |
| Households | 2,113 | 2,130 | 2,113 | 2,130 | 2,113 | 2,130 |
| Adjusted R-squared | 0.305 | 0.422 | 0.306 | 0.428 | 0.306 | 0.429 |
| Headship Joint Significance | 6.516 | 1.623 | 10.098 | 11.095 | 7.266 | 9.393 |
| Headship Prob > F | 0.012 | 0.205 | 0.000 | 0.000 | 0.000 | 0.000 |

Notes: Accounted for survey design; robust standard errors in parentheses; significance levels: *** p<0.01, ** p<0.05, * p<0.1; income sector dummies are not exclusive (no reference group); reference group for educational attainment: no education; village dummies included but not reported; time dummy equals one if observation is from 2008; outcome: log of consumption in USD PPP per day per adult equivalent (World Bank scale) with economies of scale (0.8)

**Table 3: Prevalence of Shock Exposure by Country, in Percent**

| | Any Shock | No Shock |
|---|---|---|
| Thailand | 46.64 | 53.36 |
| Vietnam | 66.52 | 33.48 |

| | Income Shock | Health Shock | Social Shock |
|---|---|---|---|
| Thailand | 34.07 | 16.69 | 7.52 |
| Vietnam | 52.34 | 23.94 | 6.33 |

| | Market Shock | | | | Agricultural Supply Shock | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Thailand | 12.73 | | | | 27.96 | | | | | | | | | | | | |
| Vietnam | 2.59 | | | | 51.00 | | | | | | | | | | | | |
| | Credit Problem | Price Shock | Job / Business Loss | Remittance Drop | Livestock Disease | Crop Pest | Storm / Rain / Cold | Drought | Birth | Illness | Accident | Death | Social Obligation | Migrated Hh Member | Crime / Law / Jail | House Damage | |
| Thailand | 2.58 | 8.02 | 2.46 | 0.68 | 0.80 | 6.81 | 9.55 | 16.75 | 0.80 | 11.92 | 2.43 | 2.58 | 2.91 | 0.51 | 3.00 | 1.59 | |
| Vietnam | 0.23 | 1.73 | 0.65 | 0.05 | 10.62 | 10.46 | 35.30 | 6.96 | 1.99 | 18.91 | 2.29 | 2.08 | 2.33 | 1.23 | 1.97 | 1.16 | |

Notes: Accounted for survey design; mean prevalence of shock exposure during 2007 and 2008

**Table 4: Correlates of Shock Exposure**

Outcome Any Shock

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Probit | Female Head | | De Facto vs. De Jure | | FHH Subgroups | |
| | Thailand | Vietnam | Thailand | Vietnam | Thailand | Vietnam |
| Female Head | 0.014 | 0.012 | | | | |
| | (0.0290) | (0.0310) | | | | |
| De Facto FHH | | | 0.022 | 0.014 | | |
| | | | (0.0594) | (0.0682) | | |
| De Jure FHH | | | 0.011 | 0.011 | | |
| | | | (0.0321) | (0.0337) | | |
| FHH, absent husband | | | | | 0.024 | 0.014 |
| | | | | | (0.0595) | (0.0682) |
| FHH, widow | | | | | 0.005 | 0.014 |
| | | | | | (0.0346) | (0.0377) |
| FHH, single | | | | | 0.042 | 0.004 |
| | | | | | (0.0681) | (0.0588) |
| HH Size (Adult Equivalents) | 0.035** | 0.017 | 0.035** | 0.017 | 0.035** | 0.017 |
| | (0.0157) | (0.0144) | (0.0157) | (0.0144) | (0.0158) | (0.0144) |
| Dep. Ratio | -0.002 | 0.014 | -0.002 | 0.014 | -0.002 | 0.013 |
| | (0.0154) | (0.0144) | (0.0155) | (0.0145) | (0.0155) | (0.0145) |
| Head: Primary Education | 0.019 | -0.012 | 0.018 | -0.012 | 0.018 | -0.012 |
| | (0.0369) | (0.0318) | (0.0370) | (0.0320) | (0.0370) | (0.0321) |
| Head: Middle School Education | -0.028 | -0.048 | -0.028 | -0.048 | -0.027 | -0.048 |
| | (0.0643) | (0.0317) | (0.0643) | (0.0319) | (0.0643) | (0.0319) |
| Head: Secondary Education | -0.060 | -0.025 | -0.059 | -0.025 | -0.060 | -0.025 |
| | (0.0691) | (0.0387) | (0.0691) | (0.0389) | (0.0691) | (0.0389) |
| Head: Tertiary Education | -0.212*** | -0.121** | -0.213*** | -0.121** | -0.214*** | -0.121** |
| | (0.0810) | (0.0531) | (0.0810) | (0.0533) | (0.0810) | (0.0533) |
| Age of Head | 0.007 | -0.003 | 0.007 | -0.003 | 0.007 | -0.003 |
| | (0.0060) | (0.0052) | (0.0061) | (0.0052) | (0.0061) | (0.0052) |
| Age Sq. | -0.000 | 0.000 | -0.000 | 0.000 | -0.000 | 0.000 |
| | (0.0001) | (0.0000) | (0.0001) | (0.0000) | (0.0001) | (0.0000) |
| Housing Index | -0.015 | -0.040** | -0.015 | -0.040** | -0.015 | -0.040** |
| | (0.0116) | (0.0175) | (0.0116) | (0.0175) | (0.0116) | (0.0175) |
| Ln(Land) | 0.027*** | 0.030*** | 0.027*** | 0.030*** | 0.027*** | 0.030*** |
| | (0.0101) | (0.0099) | (0.0101) | (0.0099) | (0.0101) | (0.0099) |
| Non-Farm Sector | 0.011 | -0.022 | 0.012 | -0.022 | 0.012 | -0.022 |
| | (0.0258) | (0.0228) | (0.0260) | (0.0229) | (0.0260) | (0.0229) |
| Crops Sector | 0.040 | 0.188*** | 0.040 | 0.188*** | 0.040 | 0.188*** |
| | (0.0390) | (0.0376) | (0.0390) | (0.0377) | (0.0390) | (0.0377) |
| Livestock Sector | -0.010 | 0.023 | -0.010 | 0.023 | -0.010 | 0.022 |
| | (0.0273) | (0.0249) | (0.0273) | (0.0249) | (0.0273) | (0.0250) |
| Observations | 2,116 | 2,122 | 2,116 | 2,122 | 2,116 | 2,122 |
| Pseudo R2 | 0.044 | 0.206 | 0.044 | 0.206 | 0.044 | 0.206 |
| Model Chi2 | 124.934 | 510.360 | 124.963 | 510.361 | 125.221 | 510.385 |
| Model Prob > Chi2 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Headship Joint Significance | 0.221 | 0.138 | 0.249 | 0.140 | 0.507 | 0.164 |
| Headship Prob > Chi2 | 0.638 | 0.710 | 0.883 | 0.933 | 0.917 | 0.983 |

Notes: Accounted for survey design; robust standard errors in parentheses; significance levels: *** p<0.01, ** p<0.05, * p<0.1; marginal effects reported; lagged covariates; reference group for educational attainment: primary education; constant and district dummies included but not reported

**Table 5: Correlates of Shock Severity**

| Outcome | Asset Loss | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Tobit | Female Head | | De Facto vs. De Jure | | FHH Subgroups | |
| | Thailand | Vietnam | Thailand | Vietnam | Thailand | Vietnam |
| Female Head | -1.205 | 1.222** | | | | |
| | (1.1594) | (0.5977) | | | | |
| De Facto FHH | | | 0.225 | 2.633** | | |
| | | | (2.3165) | (1.2276) | | |
| De Jure FHH | | | -1.641 | 0.793 | | |
| | | | (1.3512) | (0.6932) | | |
| FHH, absent husband | | | | | 0.233 | 2.637** |
| | | | | | (2.3197) | (1.2283) |
| FHH, widow | | | | | -1.082 | 0.728 |
| | | | | | (1.4209) | (0.7768) |
| FHH, single | | | | | -5.560 | 1.060 |
| | | | | | (4.3109) | (1.2401) |
| Market Shock | 0.696 | 0.045 | 0.694 | 0.025 | 0.664 | 0.030 |
| | (0.8407) | (1.5108) | (0.8413) | (1.5263) | (0.8412) | (1.5318) |
| Agricultural Supply Shock | 5.113*** | 4.703*** | 5.110*** | 4.776*** | 5.145*** | 4.772*** |
| | (1.0574) | (0.9731) | (1.0580) | (0.9685) | (1.0542) | (0.9670) |
| Health Shock | 3.904*** | 1.387** | 3.926*** | 1.429** | 3.953*** | 1.425** |
| | (0.9072) | (0.5546) | (0.9145) | (0.5587) | (0.9147) | (0.5607) |
| Social Shock | 7.880*** | 5.071*** | 7.874*** | 5.012*** | 7.901*** | 5.018*** |
| | (0.9214) | (0.7237) | (0.9200) | (0.7218) | (0.9191) | (0.7155) |
| HH Size (Adult Equivalents) | 0.306 | 0.026 | 0.332 | 0.030 | 0.309 | 0.034 |
| | (0.4354) | (0.3391) | (0.4363) | (0.3383) | (0.4387) | (0.3380) |
| Dep. Ratio | 0.126 | -0.494 | 0.060 | -0.555 | 0.068 | -0.555 |
| | (0.6274) | (0.4066) | (0.6276) | (0.4108) | (0.6285) | (0.4108) |
| Head: Primary Education | 1.327 | -0.238 | 1.247 | -0.332 | 1.269 | -0.337 |
| | (1.6814) | (0.7393) | (1.6737) | (0.7497) | (1.6772) | (0.7468) |
| Head: Middle School Education | -4.810* | 0.632 | -4.781* | 0.493 | -4.846* | 0.490 |
| | (2.8374) | (0.8062) | (2.8357) | (0.8138) | (2.8071) | (0.8091) |
| Head: Secondary Education | -3.413 | -0.699 | -3.382 | -0.827 | -3.436 | -0.829 |
| | (2.8598) | (1.0376) | (2.8596) | (1.0367) | (2.8551) | (1.0346) |
| Head: Tertiary Education | -2.938 | -2.595* | -2.906 | -2.714* | -2.790 | -2.718* |
| | (3.7168) | (1.4535) | (3.7049) | (1.4524) | (3.7340) | (1.4496) |
| Age of Head | 0.147 | 0.173 | 0.165 | 0.190 | 0.180 | 0.190 |
| | (0.2077) | (0.1206) | (0.2111) | (0.1174) | (0.2110) | (0.1176) |
| Age Sq. | -0.001 | -0.002 | -0.002 | -0.002* | -0.002 | -0.002* |
| | (0.0018) | (0.0011) | (0.0018) | (0.0011) | (0.0018) | (0.0011) |
| Housing Index | 0.497 | -0.393 | 0.478 | -0.416 | 0.462 | -0.414 |
| | (0.4360) | (0.5038) | (0.4363) | (0.5052) | (0.4355) | (0.5044) |
| Ln(Land) | 0.003 | -0.146 | 0.010 | -0.162 | 0.032 | -0.162 |
| | (0.3989) | (0.2875) | (0.4016) | (0.2879) | (0.3992) | (0.2885) |
| Non-Farm Sector | -1.564 | 0.634 | -1.494 | 0.692 | -1.480 | 0.693 |
| | (1.0920) | (0.5022) | (1.0846) | (0.5009) | (1.0843) | (0.5008) |
| Crops Sector | 1.500 | -2.114** | 1.389 | -2.137** | 1.210 | -2.141** |
| | (1.4275) | (1.0392) | (1.4429) | (1.0495) | (1.4249) | (1.0490) |
| Livestock Sector | 1.267 | 0.112 | 1.322 | 0.129 | 1.375 | 0.121 |
| | (1.1860) | (0.8291) | (1.1966) | (0.8270) | (1.1971) | (0.8303) |
| Observations | 1,290 | 1,564 | 1,290 | 1,564 | 1,290 | 1,564 |
| Pseudo R2 | 0.107 | 0.156 | 0.107 | 0.156 | 0.108 | 0.157 |
| Model Chi2 | 252.657 | 593.154 | 253.169 | 594.744 | 254.573 | 594.788 |
| Headship Joint Significance | 1.080 | 4.180 | 0.739 | 3.061 | 0.718 | 2.082 |
| Headship Prob > Chi2 | 0.299 | 0.041 | 0.478 | 0.047 | 0.541 | 0.101 |

Notes: Accounted for survey design; robust standard errors in parentheses; significance levels: *** p<0.01, ** p<0.05, * p<0.1; marginal effects reported; lagged covariates (except shock group dummies); shock groups not exclusive (no reference group); income sector dummies are not exclusive (no reference group); reference group for educational attainment: primary education; constant and community dummies not reported; sample reduced to households with shock experience; outcome: asset loss in ln(USD PPP)

**Table 6: Correlates of Vulnerability to Poverty (Pooled Panel)**

Outcome Vulnerability to Poverty

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| OLS | Female Head | | De Facto vs. De Jure | | FHH Subgroups | |
| | Thailand | Vietnam | Thailand | Vietnam | Thailand | Vietnam |
| Female Head | -0.006 | 0.009 | | | | |
| | (0.0056) | (0.0110) | | | | |
| De Facto FHH | | | -0.014** | -0.049*** | | |
| | | | (0.0067) | (0.0162) | | |
| De Jure FHH | | | -0.004 | 0.023* | | |
| | | | (0.0068) | (0.0123) | | |
| FHH, absent husband | | | | | -0.014** | -0.049*** |
| | | | | | (0.0067) | (0.0163) |
| FHH, widow | | | | | -0.002 | 0.015 |
| | | | | | (0.0076) | (0.0133) |
| FHH, single | | | | | -0.012 | 0.051** |
| | | | | | (0.0108) | (0.0237) |
| HH Size (Adult Equivalents) | 0.012*** | 0.032*** | 0.012*** | 0.032*** | 0.012*** | 0.032*** |
| | (0.0034) | (0.0050) | (0.0034) | (0.0050) | (0.0034) | (0.0050) |
| Dep. Ratio | 0.006* | 0.017*** | 0.007* | 0.018*** | 0.007* | 0.018*** |
| | (0.0037) | (0.0048) | (0.0038) | (0.0047) | (0.0038) | (0.0046) |
| Head: Primary Education | -0.016* | -0.001 | -0.016* | 0.003 | -0.016* | 0.002 |
| | (0.0084) | (0.0101) | (0.0084) | (0.0101) | (0.0083) | (0.0100) |
| Head: Secondary Education | -0.027** | -0.030*** | -0.027** | -0.026*** | -0.027** | -0.027*** |
| | (0.0117) | (0.0097) | (0.0117) | (0.0098) | (0.0117) | (0.0098) |
| Head: Upper Secondary Education | -0.040*** | -0.035*** | -0.040*** | -0.031*** | -0.040*** | -0.031*** |
| | (0.0107) | (0.0114) | (0.0107) | (0.0116) | (0.0107) | (0.0116) |
| Head: Tertiary Education | -0.025** | -0.053*** | -0.026** | -0.049*** | -0.025** | -0.050*** |
| | (0.0117) | (0.0159) | (0.0117) | (0.0162) | (0.0112) | (0.0163) |
| Age of Head | 0.000 | -0.004** | 0.000 | -0.005*** | 0.000 | -0.005*** |
| | (0.0010) | (0.0019) | (0.0010) | (0.0019) | (0.0010) | (0.0018) |
| Age Square | -0.000 | 0.000** | -0.000 | 0.000*** | -0.000 | 0.000*** |
| | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| Housing Index | -0.011*** | -0.014** | -0.011*** | -0.014** | -0.011*** | -0.013** |
| | (0.0023) | (0.0058) | (0.0022) | (0.0058) | (0.0022) | (0.0058) |
| Ln(Land) | -0.010*** | -0.018*** | -0.010*** | -0.017*** | -0.010*** | -0.017*** |
| | (0.0027) | (0.0037) | (0.0027) | (0.0037) | (0.0027) | (0.0037) |
| Non-Farm Sector | 0.002 | -0.016** | 0.002 | -0.018*** | 0.002 | -0.018*** |
| | (0.0046) | (0.0061) | (0.0047) | (0.0064) | (0.0047) | (0.0064) |
| Crops Sector | -0.006 | 0.039** | -0.006 | 0.038** | -0.006 | 0.039** |
| | (0.0069) | (0.0158) | (0.0069) | (0.0158) | (0.0070) | (0.0153) |
| Livestock Sector | -0.002 | -0.007 | -0.002 | -0.006 | -0.002 | -0.006 |
| | (0.0053) | (0.0096) | (0.0053) | (0.0095) | (0.0053) | (0.0094) |
| Time Dummy | -0.008** | -0.022*** | -0.008** | -0.022*** | -0.008** | -0.022*** |
| | (0.0030) | (0.0047) | (0.0030) | (0.0047) | (0.0030) | (0.0047) |
| Constant | -0.002 | 0.012 | 0.001 | 0.024 | 0.001 | 0.023 |
| | (0.0311) | (0.0520) | (0.0313) | (0.0523) | (0.0311) | (0.0520) |
| Observations | 1,684 | 2,060 | 1,684 | 2,060 | 1,684 | 2,060 |
| Households | 842 | 1,030 | 842 | 1,030 | 842 | 1,030 |
| Adjusted R-squared | 0.128 | 0.228 | 0.128 | 0.235 | 0.128 | 0.236 |
| Headship Joint Significance | 1.054 | 0.668 | 2.214 | 6.800 | 1.714 | 5.255 |
| Headship Prob > F | 0.307 | 0.416 | 0.114 | 0.002 | 0.168 | 0.002 |

Notes: Accounted for survey design; robust standard errors in parentheses; significance levels: *** p<0.01, ** p<0.05, * p<0.1; income sector dummies are not exclusive (no reference group); reference group for educational attainment: no education; village dummies not reported; time dummy equals one if observation is from 2008; outcome: measure of vulnerability to poverty as proposed by Calvo and Dercon (2005)

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## Appendix A: Summary statistics – 2007

| | Variable | Unit | Male-headed | | Female-headed | | De Jure FHH | | De Facto FHH | | Widow | | Single | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Thailand | Vietnam | Thailand | Vietnam | Thailand | Vietnam | Thailand | Vietnam | Thailand | Vietnam | Thailand | Vietnam |
| | ln(Cons per Capita) | USD PPP | 7.085 | 6.773 | 7.109 | 6.771 | 7.058 | 6.726 | 7.310 | 6.968 | 7.017 | 6.734 | 7.260 | 6.698 |
| | ln(Cons per Adult) | USD PPP | 7.550 | 7.270 | 7.597 | 7.232 | 7.542 | 7.173 | 7.813 | 7.485 | 7.512 | 7.180 | 7.688 | 7.151 |
| HH Composition | HH Size | members | 4.068 | 4.516 | 3.554 | 3.098 | 3.643 | 3.036 | 3.206 | 3.370 | 3.805 | 3.092 | 2.852 | 2.858 |
| | HH Size (adult equivalents) | members | 2.470 | 2.676 | 2.095 | 1.878 | 2.144 | 1.856 | 1.906 | 1.975 | 2.219 | 1.888 | 1.775 | 1.756 |
| | Dependency Ratio | ratio | 1.558 | 1.666 | 1.724 | 1.657 | 1.614 | 1.479 | 2.152 | 2.435 | 1.638 | 1.445 | 1.497 | 1.588 |
| | Children aged up to 1 | members | 0.089 | 0.089 | 0.093 | 0.057 | 0.089 | 0.050 | 0.108 | 0.091 | 0.101 | 0.054 | 0.033 | 0.037 |
| | Children aged up to 2 | members | 0.161 | 0.165 | 0.164 | 0.112 | 0.142 | 0.084 | 0.250 | 0.232 | 0.158 | 0.095 | 0.066 | 0.051 |
| | Children aged up to 3 | members | 0.223 | 0.255 | 0.226 | 0.156 | 0.195 | 0.123 | 0.347 | 0.303 | 0.221 | 0.139 | 0.066 | 0.071 |
| | Children aged up to 4 | members | 0.283 | 0.335 | 0.281 | 0.220 | 0.248 | 0.184 | 0.412 | 0.374 | 0.278 | 0.194 | 0.098 | 0.153 |
| | Children aged up to 5 | members | 0.353 | 0.414 | 0.335 | 0.271 | 0.295 | 0.231 | 0.488 | 0.446 | 0.325 | 0.249 | 0.148 | 0.171 |
| Education | No Education of HH Head | % | 8.1% | 10.4% | 21.9% | 30.7% | 25.0% | 37.0% | 9.8% | 3.4% | 26.5% | 38.2% | 18.0% | 33.1% |
| | Primary Education | % | 80.0% | 22.7% | 72.1% | 24.5% | 70.8% | 25.2% | 77.2% | 21.1% | 70.8% | 26.5% | 70.6% | 21.3% |
| | Middle School Edu | % | 5.1% | 45.2% | 3.1% | 35.4% | 1.7% | 29.6% | 8.7% | 60.7% | 1.7% | 27.1% | 1.6% | 37.5% |
| | Secondary Education | % | 4.2% | 16.7% | 1.3% | 7.3% | 1.4% | 6.5% | 1.1% | 11.0% | 0.7% | 6.0% | 4.9% | 8.2% |
| | Tertiary Education | % | 2.7% | 4.9% | 1.6% | 2.1% | 1.1% | 1.7% | 3.3% | 3.8% | 0.3% | 2.3% | 4.9% | 0.0% |
| | HH head can read | % | 92.9% | 91.1% | 79.4% | 73.8% | 76.1% | 68.6% | 92.4% | 96.6% | 74.5% | 66.9% | 83.7% | 74.2% |
| | edu_school | % | 95.5% | 91.2% | 87.1% | 71.4% | 85.0% | 65.6% | 95.6% | 96.8% | 82.9% | 65.0% | 95.1% | 67.3% |
| | Age of HH head | years | 53 | 47 | 59 | 54 | 64 | 58 | 41 | 38 | 66 | 61 | 53 | 48 |
| | Age of HH head, squared | years sq | 2999 | 2393 | 3718 | 3146 | 4219 | 3514 | 1765 | 1538 | 4479 | 3842 | 2946 | 2472 |
| Income and Remittances | ln(Land size) | ln(hectar) | 0.570 | -0.842 | 0.035 | -1.588 | 0.103 | -1.647 | -0.229 | -1.328 | 0.206 | -1.551 | -0.403 | -1.953 |
| | No of Income Sources | amount | 3.71 | 3.16 | 3.17 | 2.66 | 3.24 | 2.70 | 2.89 | 2.47 | 3.29 | 2.80 | 2.98 | 2.38 |
| | Remittance Received | % | 9.4% | 4.5% | 8.4% | 4.7% | 10.0% | 5.4% | 2.2% | 1.8% | 10.7% | 6.4% | 6.5% | 2.0% |
| | Remittance Sent | % | 2.8% | 6.8% | 2.0% | 3.6% | 1.9% | 4.3% | 2.2% | 0.2% | 2.3% | 4.0% | 0.0% | 5.2% |
| | Remittance Net Reciepient | % | 9.2% | 4.2% | 8.4% | 4.3% | 10.0% | 4.9% | 2.2% | 1.8% | 10.7% | 5.8% | 6.5% | 2.0% |
| | Net remittances per capita | USD PPP | 28.09 | -11.17 | 18.98 | 19.07 | 22.43 | 11.50 | 5.51 | 52.19 | 19.88 | 17.21 | 34.93 | -6.61 |
| Income Sector | Busy in Agriculture | % | 95.5% | 94.8% | 91.8% | 86.8% | 91.6% | 86.5% | 92.4% | 88.0% | 92.6% | 87.3% | 86.9% | 84.0% |
| | sect_crops | % | 85.4% | 90.2% | 72.2% | 79.5% | 71.3% | 79.4% | 76.0% | 79.9% | 73.1% | 82.2% | 62.3% | 70.6% |
| | sect_livestock | % | 78.1% | 77.8% | 63.4% | 68.9% | 64.6% | 66.9% | 58.7% | 77.4% | 67.1% | 72.7% | 52.5% | 48.7% |
| | sect_lstprod | % | 40.4% | 40.9% | 30.8% | 35.1% | 30.9% | 36.7% | 30.4% | 28.4% | 31.5% | 39.4% | 27.9% | 28.0% |
| | sect_fishing | % | 71.2% | 29.0% | 68.5% | 17.5% | 69.1% | 18.1% | 66.2% | 14.7% | 69.8% | 16.4% | 65.6% | 23.3% |
| | sect_nonfarm | % | 72.7% | 64.0% | 62.6% | 53.9% | 66.1% | 57.5% | 48.9% | 38.3% | 65.8% | 55.9% | 67.2% | 62.7% |
| | sect_offfarmempl | % | 56.3% | 49.4% | 49.5% | 40.9% | 53.8% | 43.8% | 32.6% | 28.3% | 53.1% | 43.2% | 57.3% | 45.6% |
| | sect_selfempl | % | 30.0% | 23.9% | 24.0% | 19.5% | 24.2% | 20.1% | 22.8% | 16.9% | 23.9% | 20.0% | 26.2% | 20.3% |
| Shocks | income_shockgroup | % | 22.3% | 39.7% | 19.1% | 35.3% | 19.8% | 37.3% | 16.3% | 26.6% | 20.2% | 38.6% | 18.0% | 33.3% |
| | market_shockgroup | % | 6.2% | 3.3% | 5.5% | 1.7% | 5.0% | 0.8% | 7.6% | 5.4% | 3.7% | 0.6% | 11.5% | 1.7% |
| | supply_shockgroup | % | 17.7% | 37.8% | 15.1% | 34.0% | 15.6% | 36.9% | 13.0% | 21.3% | 17.2% | 38.0% | 8.2% | 33.3% |
| | health_shockgroup | % | 9.4% | 23.1% | 11.8% | 27.4% | 13.4% | 27.9% | 5.4% | 25.2% | 13.1% | 29.5% | 14.7% | 22.7% |
| | social_shockgroup | % | 3.8% | 3.9% | 5.3% | 4.1% | 5.0% | 3.8% | 6.5% | 5.3% | 4.7% | 2.7% | 6.5% | 7.5% |
| | Households | N | 1724 | 1867 | 451 | 323 | 359 | 265 | 92 | 58 | 298 | 202 | 61 | 63 |

Note: Values are population weighted

## Appendix B: Summary statistics – 2008

| | Variable | Unit | Male-headed | | Female-headed | | De Jure FHH | | De Facto FHH | | Widow | | Single | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Thailand | Vietnam | Thailand | Vietnam | Thailand | Vietnam | Thailand | Vietnam | Thailand | Vietnam | Thailand | Vietnam |
| | ln(Cons per Capita) | USD PPP | 7.278 | 6.983 | 7.260 | 6.988 | 7.209 | 6.946 | 7.483 | 7.157 | 7.191 | 6.968 | 7.306 | 6.878 |
| | ln(Cons per Adult) | USD PPP | 7.748 | 7.477 | 7.760 | 7.449 | 7.709 | 7.397 | 7.984 | 7.659 | 7.700 | 7.417 | 7.759 | 7.333 |
| HH Composition | HH Size | members | 4.076 | 4.538 | 3.685 | 3.101 | 3.777 | 3.020 | 3.283 | 3.429 | 3.913 | 3.039 | 3.038 | 2.962 |
| | HH Size (adult equivalents) | members | 2.468 | 2.697 | 2.150 | 1.874 | 2.197 | 1.836 | 1.941 | 2.029 | 2.257 | 1.851 | 1.870 | 1.791 |
| | Dependency Ratio | ratio | 1.554 | 1.618 | 1.754 | 1.603 | 1.693 | 1.429 | 2.021 | 2.310 | 1.730 | 1.348 | 1.493 | 1.683 |
| | Children aged up to 1 | members | 0.075 | 0.079 | 0.081 | 0.076 | 0.076 | 0.074 | 0.102 | 0.081 | 0.083 | 0.065 | 0.038 | 0.102 |
| | Children aged up to 2 | members | 0.129 | 0.136 | 0.147 | 0.086 | 0.146 | 0.083 | 0.153 | 0.098 | 0.155 | 0.076 | 0.095 | 0.105 |
| | Children aged up to 3 | members | 0.203 | 0.211 | 0.219 | 0.133 | 0.213 | 0.117 | 0.243 | 0.197 | 0.232 | 0.106 | 0.114 | 0.154 |
| | Children aged up to 4 | members | 0.276 | 0.297 | 0.288 | 0.173 | 0.269 | 0.157 | 0.370 | 0.237 | 0.294 | 0.157 | 0.133 | 0.156 |
| | Children aged up to 5 | members | 0.340 | 0.376 | 0.359 | 0.240 | 0.336 | 0.219 | 0.461 | 0.325 | 0.367 | 0.218 | 0.170 | 0.222 |
| Education | No Education of HH Head | % | 8.0% | 12.3% | 19.9% | 27.3% | 22.7% | 31.6% | 7.7% | 9.9% | 23.5% | 35.0% | 18.8% | 21.1% |
| | Primary Education | % | 79.4% | 22.8% | 74.6% | 26.7% | 73.2% | 28.1% | 80.8% | 20.9% | 74.1% | 30.2% | 68.0% | 21.5% |
| | Middle School Edu | % | 5.2% | 43.5% | 2.4% | 35.6% | 1.5% | 31.3% | 6.4% | 53.4% | 1.0% | 26.1% | 3.8% | 47.5% |
| | Secondary Education | % | 4.8% | 15.7% | 1.9% | 7.6% | 1.8% | 6.5% | 2.6% | 12.3% | 1.0% | 5.9% | 5.7% | 8.2% |
| | Tertiary Education | % | 2.5% | 5.7% | 1.2% | 2.7% | 0.9% | 2.5% | 2.6% | 3.5% | 0.3% | 2.8% | 3.7% | 1.7% |
| | HH head can read | % | 93.1% | 89.3% | 80.8% | 74.4% | 77.8% | 70.6% | 93.6% | 90.1% | 76.9% | 67.3% | 83.1% | 80.7% |
| | edu_school | % | 95.4% | 89.2% | 88.1% | 73.1% | 86.0% | 68.5% | 97.4% | 91.8% | 84.8% | 65.1% | 92.5% | 79.2% |
| | Age of HH head | years | 54 | 48 | 60 | 55 | 64 | 59 | 43 | 39 | 66 | 62 | 54 | 48 |
| | Age of HH head, squared | years sq | 3092 | 2507 | 3850 | 3243 | 4286 | 3658 | 1939 | 1551 | 4514 | 4035 | 3043 | 2476 |
| Income and Remittances | ln(Land size) | ln(hectar) | 0.669 | -0.749 | 0.220 | -1.556 | 0.212 | -1.578 | 0.256 | -1.464 | 0.264 | -1.439 | -0.069 | -2.013 |
| | No of Income Sources | amount | 3.79 | 3.89 | 3.44 | 3.49 | 3.49 | 3.55 | 3.22 | 3.26 | 3.51 | 3.61 | 3.41 | 3.37 |
| | Remittance Received | % | 9.6% | 7.8% | 9.5% | 9.7% | 10.2% | 10.1% | 6.4% | 8.0% | 11.0% | 10.0% | 5.7% | 10.4% |
| | Remittance Sent | % | 4.0% | 13.2% | 4.8% | 7.1% | 5.0% | 6.3% | 3.8% | 10.3% | 5.2% | 6.6% | 3.7% | 5.4% |
| | Remittance Net Reciepient | % | 8.7% | 5.4% | 9.3% | 7.0% | 9.9% | 6.7% | 6.4% | 8.0% | 10.7% | 6.6% | 5.7% | 7.0% |
| | Net remittances per capita | USD PPP | 0.70 | -6.30 | 0.06 | 0.87 | -0.05 | 1.84 | 0.54 | -3.06 | 0.00 | 0.42 | -0.31 | 6.29 |
| Income Sector | Busy in Agriculture | % | 97.5% | 97.3% | 93.8% | 93.2% | 93.8% | 93.1% | 93.6% | 93.6% | 94.1% | 94.6% | 92.4% | 88.5% |
| | sect_crops | % | 87.4% | 92.0% | 78.5% | 82.8% | 77.1% | 83.5% | 84.6% | 79.8% | 77.1% | 86.7% | 77.3% | 73.5% |
| | sect_livestock | % | 84.6% | 85.9% | 78.6% | 82.8% | 79.8% | 82.8% | 73.1% | 82.6% | 80.3% | 86.5% | 77.3% | 71.1% |
| | sect_lstprod | % | 31.3% | 55.9% | 24.6% | 48.8% | 24.6% | 48.5% | 24.4% | 49.9% | 25.3% | 49.9% | 20.7% | 44.1% |
| | sect_fishing | % | 80.6% | 63.7% | 78.1% | 61.3% | 78.4% | 62.6% | 76.9% | 56.2% | 79.6% | 61.8% | 71.7% | 65.1% |
| | sect_nonfarm | % | 71.7% | 70.8% | 63.6% | 57.4% | 66.7% | 59.7% | 50.1% | 47.7% | 65.1% | 57.9% | 75.4% | 65.6% |
| | sect_offfarmempl | % | 56.5% | 57.5% | 51.7% | 39.7% | 54.1% | 44.5% | 41.1% | 20.5% | 54.0% | 43.5% | 54.7% | 47.4% |
| | sect_selfempl | % | 28.8% | 26.3% | 23.1% | 24.1% | 24.9% | 23.0% | 15.4% | 28.7% | 23.2% | 22.4% | 34.0% | 24.9% |
| Shocks | income_shockgroup | % | 47.8% | 61.5% | 41.4% | 55.2% | 42.4% | 54.7% | 37.2% | 57.4% | 42.9% | 56.1% | 39.6% | 50.4% |
| | market_shockgroup | % | 20.1% | 2.6% | 16.4% | 0.7% | 16.7% | 0.8% | 15.4% | 0.0% | 17.3% | 1.1% | 13.2% | 0.0% |
| | supply_shockgroup | % | 39.9% | 60.3% | 34.3% | 55.2% | 34.8% | 54.7% | 32.0% | 57.4% | 35.6% | 56.1% | 30.1% | 50.4% |
| | health_shockgroup | % | 22.9% | 24.3% | 26.2% | 26.6% | 27.2% | 28.2% | 21.9% | 20.1% | 27.7% | 29.2% | 24.6% | 25.3% |
| | social_shockgroup | % | 10.7% | 8.6% | 11.9% | 8.8% | 11.4% | 8.5% | 14.1% | 10.0% | 11.0% | 9.5% | 13.2% | 5.4% |
| | Households | N | 1701 | 1810 | 420 | 334 | 342 | 267 | 78 | 67 | 289 | 204 | 53 | 63 |

Note: Values are population weighted