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Household Vulnerability to Employment Shocks, 1997-1998

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Abstract

This paper studies the vulnerability of Filipino households to employment shocks that were brought on by the Asian financial crisis and the *El Niño* dry spells of 1997 and 1998. Using a panel data set of households culled from eight consecutive quarters of the Labor Force Surveys and the 1997 Family Income and Expenditures Survey, it explores the correlates of employment-shock vulnerability from among a select set of household characteristics. It finds that the factors affecting vulnerability are different in different quarters. Moreover, the statistically significant variables are different for male and female workers.

JEL classification: D10, E24
Keywords: Economic vulnerability, economic shock

1. Introduction

For households and individuals, the impact of an economic recession tends to be felt in terms of reduced incomes and lower levels of employment. Yet households and individuals are not all equally vulnerable to income and employment shocks brought on by macroeconomic downturns. For instance, households that are relatively self-sufficient or autarchic may be insulated from income shocks, and workers who have accumulated considerable stocks of human capital through education, on-the-job training, or work experience tend to be the last ones to be laid off.

These factoids notwithstanding, the empirical literature on household vulnerability to income or employment shocks due to changes in the macroeconomic environment remains scanty, particularly for developing countries where such studies may be more urgently needed to help design safety nets. In large part, this is because

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panel data are required to identify which households suffer negative changes in income or employment levels between at least two periods and to explore why some households may have a higher likelihood of experiencing such changes more than others.

This paper studies the vulnerability of Filipino households to employment shocks that were brought on by the Asian financial crisis and the *El Niño* dry spells of 1997 and 1998. Using a panel data set of households culled from eight consecutive quarters of the Labor Force Surveys (LFS) and the 1997 Family Income and Expenditures Survey (FIES) of the National Statistics Office (NSO), it explores the correlates of employment-shock vulnerability from among a select set of household characteristics, such as the location of residence, the size and age and sex composition of the household, the industry affiliation and educational attainments of household members, and the indicators of household wealth. Estimating the parameters of a reduced form specification, it finds that the factors affecting vulnerability are different in different quarters. Moreover, they are different for male and female workers. For male employment, among the more robust explanatory variables are the number of school-aged children in the household (which confers an unexpected insulating influence), affiliation with the wholesale and retail trade and the financing, insurance, real estate, and business services sectors, and having wage-earners among household members. For female employment, the variables with consistently significant coefficients turn out to be the number of adult female household members, affiliation with the manufacturing, wholesale and retail trade, and community, social, and personal services sectors, and the average number of years of schooling of adult female members (which makes households more invulnerable to employment shocks).

The rest of this paper is organized as follows: The next section presents the macroeconomic backdrop against which the employment shocks occurred. The third section then enumerates the hypotheses that were gleaned from the literature on why certain households may be vulnerable to employment shocks. In the fourth section, the empirical specification is introduced and certain issues concerning its estimation are discussed. In the fifth section, the panel data set is described briefly, and, in the sixth section, the regression results are reported and interpreted. The seventh and final section concludes the paper.

2. The macroeconomic context

At year-end 1996, a celebratory mood reigned in the Philippines. For three years in a row, GDP in real terms had grown by more than four percent, with the growth rate in 1996 at 5.85 percent (Table 1 and Figure 1).[1] More tangibly, the Ramos administration had earlier solved the severe shortage in power generating capacity that had gripped the country from 1991 to 1993. With the trade, financial, and capital market reforms for economic liberalization (which had been undertaken

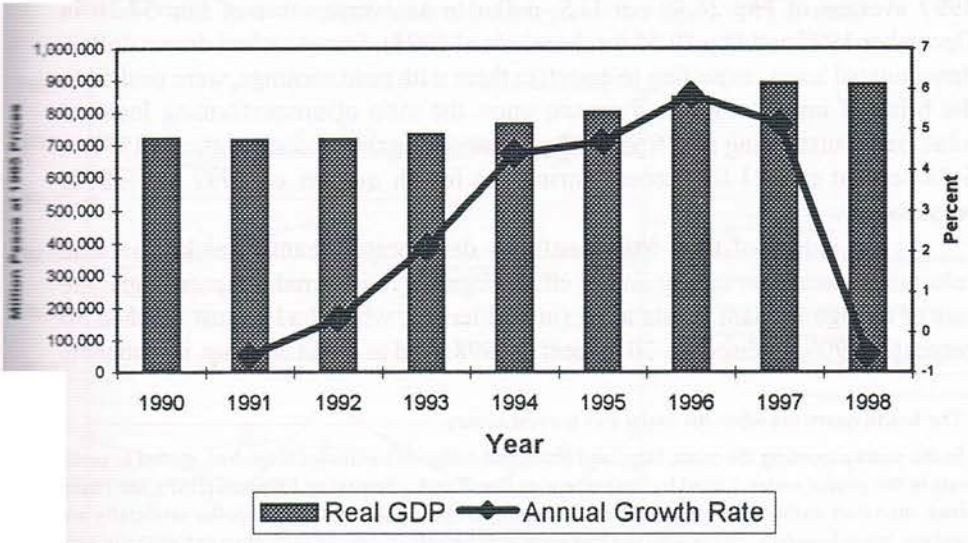
[1] In effect, the economy had expanded more rapidly than the average annual population growth rate of 2.3 percent.

Table 1
Real Gross Domestic Product and Annual Growth Rates
1990 to 1998

Year	Real GDP	Annual Growth Rate
1990	720,690	
1991	716,522	-0.58
1992	718,941	0.34
1993	734,156	2.12
1994	766,368	4.39
1995	802,224	4.68
1996	849,121	5.85
1997	892,860	5.15
1998	888,075	-0.54

Notes: GDP is given in million pesos at 1985 prices
Source: National Statistical Coordination Board

Figure 1
Real Gross Domestic Product and its Annual Growth Rate, 1990 to 1998



since the late 1980s) also in place, the three consecutive years of substantial growth held the promise that, at long last, the country was poised to take its place as the newest tiger (cub) in the Pacific Rim and that it had bucked the boom-bust cycle that had characterized its growth trajectory since the 1960s.

In April 1997, however, an *El Niño*-induced drought set in for six months, which caused agricultural output to decline during the second quarter. Then, in July of the same year, the Thai baht was devalued, which signaled the start of the Asian financial crisis.

Fortunately in 1997, the havoc wrought by the *El Niño* dry spell turned out to be milder than expected. Accordingly, the seasonally adjusted monetary values of agricultural output during the third and fourth quarters came out better than that of the second quarter (Table 2 and Figure 2). In addition, lags in the transmission mechanisms as well as counter measures adopted by the government and the private sector (e.g., the ultimately futile defense of the peso-dollar exchange rate, the increased spending on public infrastructure, and the virtual roll-over of bank loans) delayed the onset of the adverse effects of the crisis on the real sector. Thus, despite the twin shocks suffered by the Philippine economy in 1997, real GDP still managed to post a respectable 5 percent growth.

In contrast, 1998 was a different story altogether. Instead of winding down as expected, the *El Niño* lingered, causing agricultural production to decline during the first and second quarters. Moreover, the anticipated rebound of the third and fourth quarters was not as good as that of the previous year.[2] Consequently, the gross value added for the agriculture sector posted a negative growth rate for the year.

In addition, by 1998, the shockwave of the financial turmoil had inexorably worked its way into the real sector: With the depreciation of the peso (from its June 1997 average of Php 26.40 per U.S. dollar to an average rate of Php 37.20 in December 1997 and Php 40.54 for the whole of 1998), firms that had drawn dollar-denominated loans, expecting to amortize them with peso earnings, were pushed to the brink of insolvency.[3] As a consequence, the ratio of nonperforming loans to total loans outstanding rose from 4.03 percent during the second quarter of 1997 to 5.43 percent and 11.02 percent during the fourth quarter of 1997 and 1998, respectively.

As the values of their loan portfolios deteriorated, banks quickly became reluctant to lend new money and in effect began to ration credit. Accordingly, the rate of change in loans outstanding (in real terms), which had almost reached 30 percent in 1996, declined to –10 percent in 1998. And as credit dried up, investments

[2] The fourth quarter is when the major rice harvest occurs.

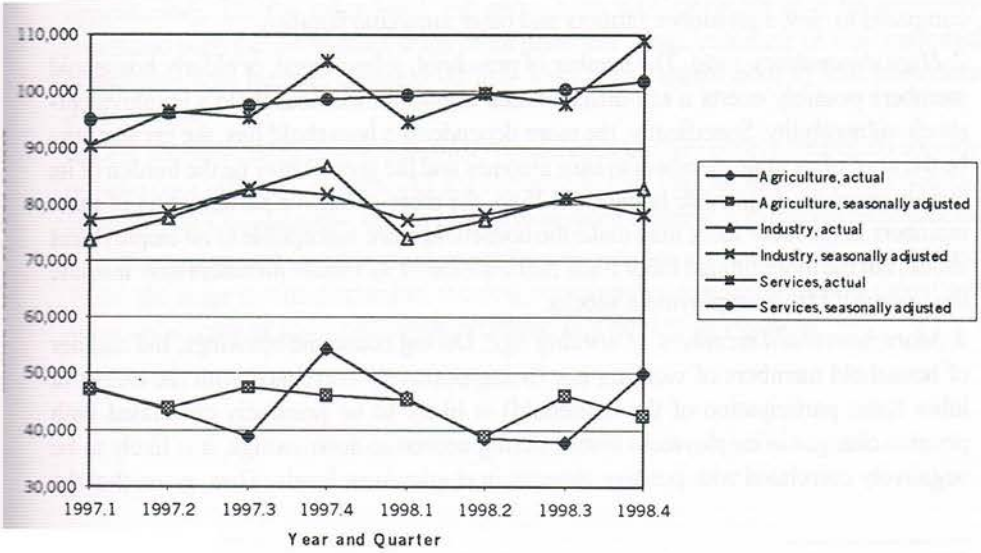
[3] In the years preceding the crisis, large and unhedged dollar-denominated loans had started to proliferate in the private sector. Lulled by the perception that Bangko Sentral ng Pilipinas (BSP), the Philippines' monetary authority, was committed to keeping the peso value of the U.S. dollar artificially low, bankers, manufacturers, and politicians had borrowed heavily in dollars to finance dabblings in equities and real estate. Thus, loans outstanding to financial institutions, real estate, and business services rose from Php 124 billion as of year-end 1995 to Php 348 billion as of year-end 1997, as a result of which its share of total loans outstanding expanded from 16.8 percent to 24.6 percent.

Table 2
Gross Value Added in Agriculture, Industry, and Services
(In Million Pesos at 1985 Prices)

ear and Quarter	Agriculture, Fishery, and Forestry		Industry		Services	
	Actual	Seasonally Adjusted	Actual	Seasonally Adjusted	Actual	Seasonally Adjusted
1997.1	47,651	47,103	73,740	77,144	90,400	94,912
1997.2	43,701	44,106	77,621	78,616	96,322	96,042
1997.3	39,029	47,474	82,550	82,778	95,334	97,611
1997.4	54,332	46,223	86,778	81,902	105,402	98,696
1998.1	45,828	45,301	73,878	77,288	94,497	99,214
1998.2	38,668	39,026	77,050	78,038	99,794	99,504
1998.3	37,831	46,017	80,931	81,154	97,998	100,338
1998.4	50,118	42,638	82,695	78,049	108,787	101,865

urce: National Statistical Coordinaton Board

Figure 2
Gross Value Added in Agriculture, Industry, and Services, 1997 to 1998



fell drastically during the first two quarters of 1998 (as well as for the entire year) (Table 3 and Figure 3). At the same time, the credit crunch led to severe liquidity constraints for firms that customarily relied on bank loans for working capital. As these firms were forced to cut back on their scale of operations, industrial output declined during the fourth quarter of 1997 and the first quarter of 1998 (and was moribund throughout 1998).

Given the bleak economic situation in 1998, it was therefore hardly surprising that employment rate fell in the first two quarters, recovered somewhat during the third quarter, and declined again during the fourth quarter (Table 4 and Figure 4).

3. Vulnerability to employment shocks

Although all households toiled under the same macroeconomic and environmental adversities in 1997 and 1998 as were described in the previous section, they were not uniformly affected by them. In particular, they were not all equally vulnerable to the employment shocks, which is defined in this paper as a negative four-quarter difference in the number of employed household members of working ages. More precisely, if $y_{i,t}$ is the number of working-age members of household i who were employed in quarter t, then employment-shock vulnerability may be defined by the condition that $\Delta y_{i,t,t-4} < 0$, where $\Delta y_{i,t,t-4} = y_{i,t} - y_{i,t-4}$.

Which households were more vulnerable to the employment shocks that occurred in 1997 and 1998? The hypotheses that were culled from the literature may be grouped into eight categories:[4]

1. Dependence of sources of livelihood on the larger economy. Households whose members' sources of livelihood are sensitive to the economic conditions of areas outside of the immediate community are likely to be more vulnerable to employment shocks compared to, say, subsistence farmers and other autarchic families.

2. High dependency ratio. The number of preschool, school-aged, or elderly household members possibly exerts a sex-differentiated impact on the household's employment-shock vulnerability. Specifically, the more dependents a household has, the greater may be the need of its male members to earn incomes and the greater may be the burden of its female members to provide home care. If so, the more extensive participation of male members in the labor force may make the household more susceptible to an employment shock, but the more limited labor force participation of its female members may insulate the household from employment shocks.

3. More household members of working age. During economic upswings, the number of household members of working age (being positively correlated with the extent of labor force participation of the household) is likely to be positively correlated with positive changes in employment levels; during economic downswings, it is likely to be negatively correlated with positive changes in employment levels. Thus, given that the

[4] These are mostly loosely based on Glewwe and Hall [1995, 1998].

economy moved from boom to bust during the period under consideration, households with more members of working age may have been more susceptible to employment shocks.

On the other hand, the more household members of the opposite sex there are, the less pressure there is for working-age members of a particular sex to find employment and contribute to household income. In turn, the more limited labor force participation of members of that sex may make the household less susceptible to employment shocks.

4. Less diversified labor allocation portfolio. Households whose members work in different industry groups are less likely to suffer employment shocks than households with less diversified employment portfolios. This is because the industry groups are not likely to be uniformly affected by economic shocks, and some industries may fare better than others.

5.Dependence on wage work. Households whose members are wage earners rather than own-account workers or workers in family-owned enterprises are more likely to suffer employment shocks.

6. Poorly educated household members. Households whose working-age members are not well educated are more likely to suffer employment shocks. There are at least two reasons for this. First, workers with minimal stocks of human capital are more likely to be dismissed during economic downturns; they are also the least likely to find employment. Second, poorly educated individuals may be less able to adapt to and exploit the changing economic circumstances [Schultz 1975]. This inflexibility in the face of adversity makes them liable to become unemployed. Moreover, once unemployed, they are more likely to have longer spells in that state.

7. Less assets or non-labor income. The influence of household resources is ambiguous. On the one hand, poorly endowed households are less able to finance the job search of members who become unemployed. Given the constraints on credit during the period under consideration, they are also less able to take advantage of self-employment opportunities. On the other hand, the endowment of households may be positively correlated with the reservation wage of its members. Thus, members of well-endowed households who become unemployed may have a less urgent need to find immediate employment.

8. Less socially connected households. Households that are poorly connected socially or have poor information networks are less able to find jobs for members who become unemployed. Consequently, they are likely to be more vulnerable to employment shocks.

The operational variables for testing these hypotheses are presented in section five. To set the stage for the discussion, the next section introduces the empirical model and gives an account of some estimation problems that need to be resolved.

Table 3
Real Capital Formation
(In Million Pesos at 1985 Prices)

Year and Quarter	Real Capital Formation	
	Actual	Seasonally Adjusted
1997.1	60,182	58,539
1997.2	54,644	54,499
1997.3	53,803	60,296
1997.4	66,496	61,744
1998.1	56,567	55,023
1998.2	44,706	44,588
1998.3	43,507	48,757
1998.4	51,700	48,005

Source: National Statistical Coordinaton Board

Figure 3
Real Capital Formation, 1997 to 1998

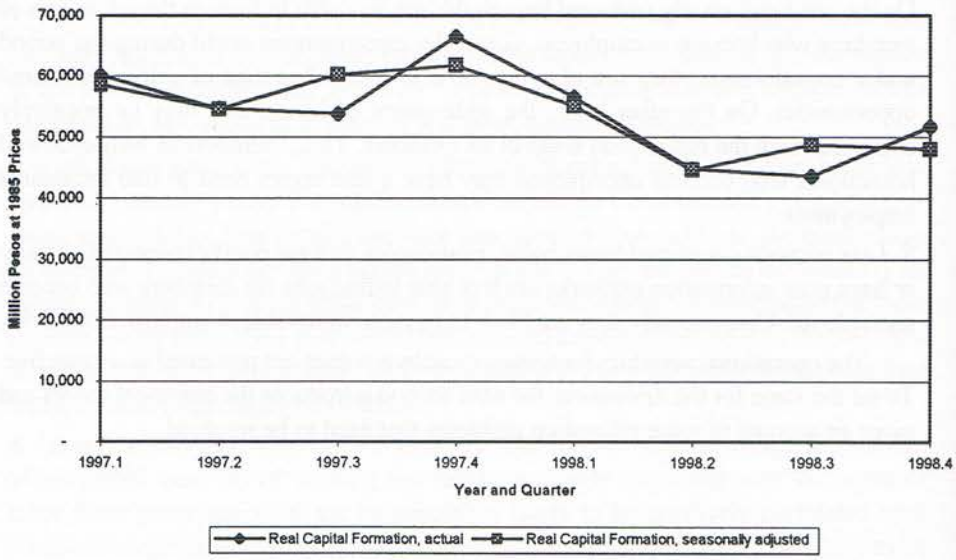
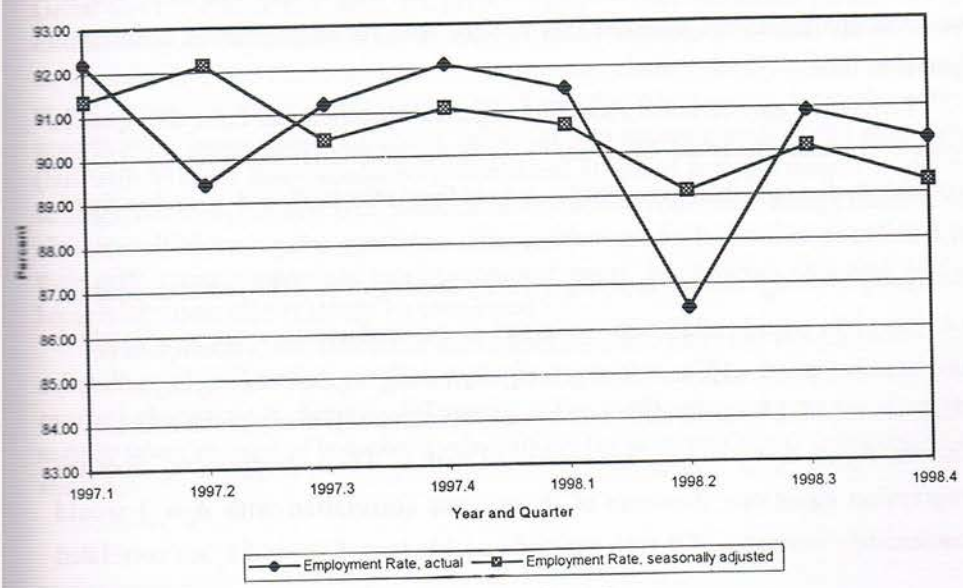


Table 4
Labor Force Statistics, 1997 to 1998

	Labor Force Participation Rate		Employment Rate		Unemployment Rate	
	Actual	Seasonally Adjusted	Actual	Seasonally Adjusted	Actual	Seasonally Adjusted
7.1	65.73	67.05	92.20	91.34	7.80	8.59
7.2	69.16	65.87	89.42	92.14	10.58	8.14
7.3	66.01	66.85	91.22	90.39	8.78	9.53
7.4	65.70	66.88	92.09	91.08	7.91	9.09
8.1	65.38	66.69	91.50	90.65	8.50	9.36
8.2	69.19	65.90	86.47	89.10	13.53	10.40
8.3	65.41	66.24	90.92	90.10	9.08	9.85
8.4	66.27	67.46	90.25	89.27	9.75	11.19

e of basic data: Public use files of the Labor Force Survey

Figure 4
Employment Rate, 1997 to 1998



4. Empirical framework

In developing the empirical framework to explore the vulnerability of households to employment shocks, let the starting point be the following reduced form function:

$$y_{i,t} = \theta_t(\mathbf{x}_i, \mathbf{w}_{i,t}; \delta_i, \rho_i, u_{i,t}) \qquad \text{for } i = 1,2,\ldots,N \text{ and } t = 1,2,\ldots,T, \quad (1)$$

where $y_{i,t}$ represents the number of working-age members of the ith household who are gainfully employed at time t, $\mathbf{x}_i$ is a vector of exogenous variables whose values during the initial period ($t = 1$) exert lagged effects on $\{y_{i,t}\}_{t=1}^{T}$, $\mathbf{w}_{i,t}$ is a vector of exogenous variables that have contemporaneous effects on the dependent variable (e.g., the life-cycle stage of the household), δ_i is the household's rate of time preference, ρ_i is the household's risk aversion parameter, and $u_{i,t}$ is the error term.

Assuming a linear form for θ_t and anticipating the eight-quarter span of the panel data set, (1) may be rewritten as

$$\begin{aligned}
y_{i1} &= \boldsymbol{\beta}_1'\mathbf{x}_i + \boldsymbol{\alpha}_1'\mathbf{w}_{i1} + \delta_{1i} + \rho_i + \delta_{2i}\mathbf{w}_{i1} + u_{i1} && (2.1)\\
y_{i2} &= \boldsymbol{\beta}_2'\mathbf{x}_i + \boldsymbol{\alpha}_2'\mathbf{w}_{i2}' + \delta_{1i} + \rho_i + \delta_{2i}\mathbf{w}_{i2} + u_{i2} && (2.2)\\
&\vdots\\
y_{i8} &= \boldsymbol{\beta}_8'\mathbf{x}_i + \boldsymbol{\alpha}_8'\mathbf{w}_{i8} + \delta_{1i} + \rho_i + \delta_{2i}\mathbf{w}_{i8} + u_{i8} && (2.8)
\end{aligned}$$

where the household-specific rate of time preference, δ_i, is specified as $\delta_{1i} + \delta_{2i}\mathbf{w}_{i,t}$ to allow the household discount rate to vary with its circumstances at different points in time.

Five points may be noted about this empirical specification: First, the equation system is under-identified. Specifically, (without additional instruments) it is not possible to distinguish between the household fixed effects, δ_{1i} and ρ_i, and neither is it feasible to estimate the household-specific nonlinear component of the rate of time preference δ_{2i}. Second, applying ordinary least squares (OLS) on each equation (2.1) to (2.8) would yield biased estimates of the coefficients, since $y_{i,t} \geq 0$, which implies that $u_{i,t} \geq -(\boldsymbol{\beta}_t'\mathbf{x}_i + \boldsymbol{\alpha}_t'\mathbf{w}_{i,t} + \delta_{1i} + \rho_i + \delta_{2i}\mathbf{w}_{i,t})$, i.e., $E(u_{i,t} \mid y_{i,t} \geq 0) \neq 0$. Alternatively, OLS would also yield biased estimates of β if any of the unobserved factors, δ_{1i}, ρ_i, $\delta_{2i}\mathbf{w}_{i,t}$, and $u_{i,t}$, are correlated with $\mathbf{x}_i$. Third, dropping $\mathbf{w}_{i,t}$ from the regression equations (because of its obvious correlation with $\delta_{2i}\mathbf{w}_{i,t}$) would contaminate estimates of β with omitted variable bias if $\mathbf{w}_{i,t}$ and $\mathbf{x}_i$ are correlated

(i.e., if the initial conditions do not only affect the dependent variable but covary with the elements of the contemporaneous vector as well). Fourth, the disturbance terms are bound to have heteroscedastic variances, because the variability of $y_{i,t}$ is likely to depend on the number of household members of working age.[5] Consequently, the error terms are specified to have the following variance matrix in partitioned form,

$$\Sigma = \begin{bmatrix} \Sigma_1 & & & \\ \mathbf{0} & \Sigma_2 & & \\ \vdots & \vdots & \ddots & \\ \mathbf{0} & \mathbf{0} & \cdots & \Sigma_N \end{bmatrix}$$

where

$$\Sigma_i = \begin{bmatrix} \sigma_{i,1}^2 & & & \\ \sigma_{i,1,2} & \sigma_{i,2}^2 & & \\ \vdots & \vdots & \ddots & \\ \sigma_{i,1,8} & \sigma_{i,2,8} & \cdots & \sigma_{i,8}^2 \end{bmatrix},$$

for $i = 1, 2, \ldots, N$. In words, the disturbance terms are assumed to have heteroscedastic variances, and to be correlated within but independent across panels (or households). Given this error structure, there are $[T(T + 1)/2]N = 36N$ additional parameters to estimate: $8N$ variances and 28 covariances. Clearly, without additional assumptions on the natures of the heteroscedasticity and autocorrelation, the system of equations is not estimable from observations on N panels. Abstracting from the other specification issues identified above, using OLS to estimate each of the equations (but with White's heteroscedasticity-consistent standard errors) remains a viable strategy, however, because OLS produces unbiased and consistent, though inefficient, estimates. Fifth, using the panel data technique of estimating not (2.1) to (2.8) but their differences would yield more precise estimates, because the variances of the household fixed effects would be eliminated.[6]

Serendipitously, our interest is not in obtaining estimates for the parameters of equations (2.1) to (2.8) per se. Rather, our goal is to obtain estimates of (quarter-on-quarter) changes in β, because differences in the coefficients (of a given variable) may be taken as signs of household vulnerability (or invulnerability) to employment shocks.

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[5] Obviously, there can be other sources of heteroscedasticity as well.

[6] This is discussed in greater detail below.

Let $\Delta y_{i,t,t-4} = y_{i,t} - y_{i,t-4}$, $\Delta \mathbf{w}_{i,t,t-4} = \mathbf{w}_{i,t} - \mathbf{w}_{i,t-4}$, $\Delta \beta_{i,t,t-4} = \beta_{i,t} - \beta_{i,t-4}$, $\Delta \alpha_{i,t,t-4} = \alpha_{i,t} - \alpha_{i,t-4}$, and $\Delta u_{i,t,t-4} = u_{i,t} - u_{i,t-4}$, for $t = 5, \ldots, 8$. Subtracting (2.1) from (2.5), (2.2) from (2.6), and so on yields

$$\Delta y_{i,5,1} = \Delta \boldsymbol{\beta}'_{5,1}\mathbf{x}_i + \boldsymbol{\alpha}'_5 \Delta \mathbf{w}_{i,5,1} + \Delta \boldsymbol{\alpha}'_{5,1}\mathbf{w}_{i,1} + \delta_{2i}\Delta \mathbf{w}_{i,5,1} + \Delta u_{i,5,1} \quad (3.1)$$

$$\Delta y_{i,6,2} = \Delta \boldsymbol{\beta}'_{6,2}\mathbf{x}_i + \boldsymbol{\alpha}'_6 \Delta \mathbf{w}_{i,6,2} + \Delta \boldsymbol{\alpha}'_{6,2}\mathbf{w}_{i,2} + \delta_{2i}\Delta \mathbf{w}_{i,6,2} + \Delta u_{i,6,2} \quad (3.2)$$

$$\Delta y_{i,7,3} = \Delta \boldsymbol{\beta}'_{7,3}\mathbf{x}_i + \boldsymbol{\alpha}'_7 \Delta \mathbf{w}_{i,7,3} + \Delta \boldsymbol{\alpha}'_{7,3}\mathbf{w}_{i,3} + \delta_{2i}\Delta \mathbf{w}_{i,7,3} + \Delta u_{i,7,3} \quad (3.3)$$

$$\Delta y_{i,8,4} = \Delta \boldsymbol{\beta}'_{8,4}\mathbf{x}_i + \boldsymbol{\alpha}'_8 \Delta \mathbf{w}_{i,8,4} + \Delta \boldsymbol{\alpha}'_{8,4}\mathbf{w}_{i,4} + \delta_{2i}\Delta \mathbf{w}_{i,8,4} + \Delta u_{i,8,4} \quad (3.4)$$

Several observations may be made about (3.1) to (3.4): First, the household fixed effects, i.e., the risk aversion parameter and the linear component of the rate of time preference, have been eliminated. Second, being differences of the original disturbances, the new error terms, $\Delta u_{i,t,t-4}$, no longer have a restricted range (since it may be reasonably assumed that $-\infty < \Delta y_{i,t,t-4} < \infty$).[7] Moreover, they may be less correlated with the regressors. Third, the equations provide a direct way to estimate $\Delta\beta$. Indeed, those coefficient estimates that are found to be statistically significant from zero may be interpreted as follows: Households with large values of a variable whose coefficient estimate is negative (positive) may be vulnerable (impervious) to employment shocks. Fourth, using OLS to estimate the coefficients of each of the equations, (3.1) to (3.4) (rather than the equations, (2.1) to (2.8), and then taking differences), neither reduces the bias of the $\Delta\beta$ estimates nor corrects for heteroscedasticity. Instead, doing so yields more efficient estimates. To see this, let $h_i = \delta_{1i} + \rho_i$ and assume away the effects of $(\boldsymbol{\alpha}'_t + \delta_{2i})\mathbf{w}_{i,t}$ for expositional convenience. Then the heteroscedasticity-consistent estimated variance matrix of $\hat{\boldsymbol{\beta}}_t$ for $t = 1, 2, \ldots, 8$, assuming that h_i and $u_{i,t}$ are not correlated, would be

$$\text{Est } V(\hat{\boldsymbol{\beta}})_t = (\mathbf{X}'\mathbf{X})^{-1}\mathbf{X}'\hat{\mathbf{V}}_t\mathbf{X}(\mathbf{X}'\mathbf{X})^{-1}, \text{ where}$$

$$\hat{\mathbf{V}}_t = \begin{bmatrix} \hat{h}^2_{1,t} + \hat{u}^2_{1,t} & & & \\ 0 & \hat{h}^2_{2,t} + \hat{u}^2_{2,t} & & \\ \vdots & \vdots & \ddots & \\ 0 & 0 & \ldots & \hat{h}^2_{N,t} + \hat{u}^2_{N,t} \end{bmatrix}.$$

[7] To be precise about it, the range of $\Delta y_{i,t,t-4}$ is $(-z_i, z_i)$, where z_i is the number of members of working-ages in the ith household. But there seems to be little gain, if at all, from setting bounds on $\Delta y_{i,t,t-4}$ in this way.

Hence, if each of the equations (2.1) to (2.8) is regressed using OLS and estimates of $\Delta\beta$ are then obtained from $\hat{\beta}_t - \hat{\beta}_{t-4}$, the robust variance matrix of $\Delta\hat{\beta}$ so derived would be $(\mathbf{X}'\mathbf{X})^{-1}\mathbf{X}'(\hat{\mathbf{V}}_t + \hat{\mathbf{V}}_{t-4})\mathbf{X}(\mathbf{X}'\mathbf{X})^{-1}$. In contrast, the robust variance matrix of Est $\Delta\beta$ when $\Delta\beta$ are directly estimated from each of the equations (3.1) to (3.4) is $(\mathbf{X}'\mathbf{X})^{-1}\mathbf{X}'\hat{\Omega}_{t,t-4}\mathbf{X}(\mathbf{X}'\mathbf{X})^{-1}$, where

$$\hat{\Omega}_{t-4} = \begin{bmatrix} \hat{u}_{1,t}^2 + \hat{u}_{1,t-4}^2 - 2\hat{u}_{1,t}^2\hat{u}_{1,t-4}^2 & & \\ 0 & \hat{u}_{2,t}^2 + \hat{u}_{2,t-4}^2 - 2\hat{u}_{2,t}^2\hat{u}_{2,t-4}^2 & \\ \vdots & \vdots & \ddots \\ 0 & 0 & \cdots \quad \hat{u}_{N,t}^2 + \hat{u}_{N,t-4}^2 - 2\hat{u}_{N,t}^2\hat{u}_{N,t-4}^2 \end{bmatrix}$$

Est V(Est $\Delta\beta$) is likely to be smaller than Est $V(\hat{\beta}_t - \hat{\beta}_{t-4})$, since it may be expected that $\hat{u}_{i,t}\hat{u}_{i,t-4} \geq 0$ (i.e., time periods that are four quarters apart are affected by the same seasonal influences). Thus, estimates of $\Delta\beta$ that are obtained from OLS regressions of (2.1) to (2.8) would be identical to those that are obtained from OLS regressions of (3.1) to (3.4). But robust variance estimates from the latter method are likely to be more efficient.

5. Data set and variables

The data set is drawn from the sample of households that are common to the Labor Force Surveys (LFS) of 1997 and 1998 as well as to the Family Income and Expenditures Survey (FIES) of 1997. Regular undertakings of the National Statistics Office (NSO), the LFS and FIES are nationally and regionally representative surveys that collect information on demographic and socioeconomic characteristics of the population. Their sample consists of some thirty thousand households from the 73 provinces and 14 chartered cities of the Philippines.

The distinction between the two surveys is that while the LFS, which is carried out quarterly, focuses on employment-related factors in order to monitor developments in the domestic labor market, the FIES, which is a triennial activity, gathers data on components of household incomes and expenditures, in part to provide information for the national income accounts as well as to track poverty-related trends. The two surveys do share a common sampling frame, however, and start an FIES year with the same sample, 25 percent of which is replaced every quarter for the LFS.[8] Thus, given the appropriate key fields, researchers can identify the sample households (but not their individual members), which are shared by the LFS and FIES, and in effect expand the set of variables for which data are available.

[8] An exception was made for 1997 and 1998 to allow an eight quarter panel of households to be formed.

Table 5 presents the descriptive statistics of the variables used in the regressions. As may be surmised from the table, the number of employed males and of employed females comprise the bases of the dependent variables. Negative changes in the sex-differentiated number of employed household members are chosen as the dependent variables because these are deemed to be the most appropriate measures of employment-related welfare shocks that may be experienced by households during economic downturns. The labor force participation rate and the unemployment rate are not good indicators of such welfare shocks, the former because of the added worker phenomenon and the latter because of the discouraged worker effect.[9]

As for the explanatory variables, Table 5 shows that, with the exception of non-labor income, which covers the whole of 1997, all the other variables pertain to the first quarter of 1997. The table also shows that the groupings of these variables conform to the different categories of hypotheses discussed earlier. First, the extent of interaction of households with the larger economy is intended to be captured by the variables on the urban and regional location of household residence. Second, the dependency ratio and the labor resources of the household are expected to be reflected in the age and sex compositions variables, which include the number of preschool (i.e., six years old or younger) and of school-aged (i.e., seven to fourteen years old) children in the household, the number of elderly (i.e., 65 years old or older) household members, and the number of male and of female members of the household of working age.[10] Third, the allocation of labor resources is meant to be proxied by dummy variables on the industry affiliation of employed household members. Fourth, dependence on wage work is indicated by the presence of wage earners among the household members. Fifth, the educational attainment of household members is captured by the average years of schooling of male and of female members of working age. Sixth, the asset variables include access to sanitary water and water-sealed toilet facilities, occupying a house made of predominantly strong materials, car ownership, and non-labor income. Seventh, the social connections of the household and the extensiveness of its information networks are intended to be captured by the characteristics of the household head, such as sex, age, and years of schooling. This is because the demographic and socioeconomic attributes of the household head are often indications of the household's credentials and social standing.

[9] The added worker hypothesis claims that the labor force participation rate increases during economic downturns because secondary workers enter the workforce as a result of the retrenchment of or wage cuts experienced by the primary workers of the household. The discouraged worker hypothesis posits that the unemployment rate decreases during economic recessions because some workers get so discouraged that they drop out of the labor force altogether.

[10] In the Philippines, the legal age span of the workforce is 15 to 64 years old. Children and elderly persons who want to work are required to obtain special work permits from the Department of Labor and Employment.

	Male Sample		Female Sample	
	Mean	Std Dev	Mean	Std Dev
Dependent Variables				
Number of working-age members employed in Q1 1997	1.26870	0.79962	0.69613	0.74176
Number of working-age members employed in Q2 1997	1.29917	0.85178	0.72128	0.78650
Number of working-age members employed in Q3 1997	1.24469	0.80299	0.70700	0.73541
Number of working-age members employed in Q4 1997	1.25046	0.80366	0.72626	0.74417
Number of working-age members employed in Q1 1998	1.24261	0.81234	0.69816	0.73105
Number of working-age members employed in Q2 1998	1.24746	0.83459	0.69409	0.75260
Number of working-age members employed in Q3 1998	1.22922	0.82997	0.69363	0.71314
Number of working-age members employed in Q4 1998	1.22784	0.83837	0.70542	0.73801
Household attributes as of the first quarter of 1997				
National Capital Region	0.07802	0.26824	0.07863	0.26919
Ilocos	0.05794	0.23366	0.06028	0.23803
Cagayan Valley	0.05355	0.22516	0.05303	0.22411
Central Luzon	0.10065	0.30089	0.09993	0.29994
Southern Tagalog	0.12719	0.33323	0.12826	0.33441
Bicol	0.05886	0.23540	0.05892	0.23550
Western Visayas	0.08056	0.27219	0.08248	0.27513
Central Visayas	0.07179	0.25817	0.06911	0.25368
Eastern Visayas	0.05425	0.22653	0.05348	0.22501
Western Mindanao	0.04432	0.20583	0.04373	0.20453
Northern Mindanao	0.04524	0.20786	0.04441	0.20604
Southern Mindanao	0.05817	0.23409	0.05778	0.23336
Central Mindanao	0.04155	0.19958	0.04102	0.19835
Cordillera Administrative Region	0.04271	0.20222	0.04351	0.20402
Autonomous Region of Muslim Mindanao	0.04178	0.20011	0.04237	0.20147
Caraga	0.04340	0.20377	0.04305	0.20300
Urban area	0.56210	0.49619	0.56651	0.49561
Number of children 6 years and younger	0.93375	1.10727	0.92545	1.10472

Table 5 (continued)
Descriptive Statistics of Variables

	Male Sample		Female Sample	
	Mean	Std Dev	Mean	Std Dev
Number of children between 7 and 14 years old	1.14127	1.22088	1.14707	1.21597
Number of elderly household members	0.17452	0.46688	0.17562	0.46131
Number of adult males (other than household head, if male)	0.78440	1.01713	1.58441	1.04194
Number of adult females (other than household head, if female)	1.54386	0.95629	1.48629	0.94265
A household member is affiliated with				
Agriculture, fishery, and forestry	0.45660	0.49817	0.43757	0.49614
Mining and quarrying	0.00946	0.09684	0.00838	0.09119
Manufacturing	0.13804	0.34498	0.13959	0.34660
Electricity, gas, and water	0.01016	0.10028	0.00974	0.09824
Construction	0.09949	0.29936	0.09336	0.29097
Wholesale and retail trade	0.20729	0.40542	0.21641	0.41184
Transportation, storage, and communication	0.12419	0.32984	0.11965	0.32458
Financing, insurance, real estate, and business services	0.03786	0.19087	0.03852	0.19248
Community, social, and personal services	0.27378	0.44595	0.27804	0.44809
A household member is a wage earner	0.57641	0.49418	0.56809	0.49540
Average years of schooling of male household members	4.52607	4.89551	4.19868	4.86082
Average years of schooling of female household members	7.87400	3.85725	8.12879	3.68367
House has sanitary water and water-sealed toilet facilities	0.19898	0.39928	0.20394	0.40297
House is predominantly made of strong materials	0.58380	0.49299	0.58894	0.49208
Household has a car	0.08657	0.28123	0.08566	0.27989
Nonlabor income (in thousands)	24.65697	73.17747	25.62470	73.99043
Male headed household	0.89843	0.30212	0.86766	0.33889
Age of household head	45.83218	13.10356	46.10333	13.17946
Years of schooling of household head	7.55771	3.77308	7.60390	3.78645
Number of Observations	4332		4413	

6. Estimation results

This section reports and interprets the regression results for equations (2.1) to (2.8) and (3.1) to (3.4), using the data set described in the previous section. Three sets of tables are presented: Tables 6a and 6b contain the parameter estimates of (2.1) to (2.8), which are obtained using OLS; Tables 7a and 7b show the coefficient estimates and standard errors of the parameters in (3.1) to (3.4), which are derived from the estimates presented in Tables 6a and 6b; and Tables 8a and 8b provide the parameter estimates of (3.1) to (3.4), which are obtained directly from OLS regressions of four-quarter differences in employment levels.

6.1 Correlates of employment at the household level

Table 6a reports the OLS coefficient estimates of (2.1) to (2.8) with the number of employed male members of the household as the dependent variable, while Table 6b reports the results with the number of employed female members as the dependent variable. As expected, the results of the Cook-Weisberg test indicate the presence of heteroscedasticity. Specifically, heteroscedastic variances are found in all of the eight quarters for both men and women. No attempt is made, however, to treat the inefficiency of the coefficient estimates. Instead, White standard errors are calculated for these estimates.

Table 6a indicates very little geographic variation in the employment of males. Specifically, relative to households residing in NCR, in the first quarter of the period under consideration, only families based in Ilocos, Cagayan Valley, and Northern Mindanao had significantly more employed members, and only those residing in urban areas of CARAGA had significantly fewer employed members; in the second quarter, only those living in urban areas of Central Mindanao had fewer employed members; in the third quarter, only those in ARMM cities had more employed members; and so on. Moreover, the influences of the location of household residence varied over the eight quarters. Indeed, only for residence in urban areas of Central Mindanao were the coefficient estimates statistically significant for three quarters. Perhaps these results indicate that the spatial impact of the employment shocks was more or less uniform throughout the entire country.

Turning to the household composition variables, the coefficient estimates of the number of preschool children are positive and significant in the first and second quarters, while those of the number of school-aged children are positive and significant in the sixth to the eighth quarters. Perhaps in the case of men, the presence of children induced a strong need to seek gainful employment, particularly because the female members of the household might have been constrained to care for the children and were thus unable to participate in the labor force. As expected, the number of adult female members tends to have negative (or zero) coefficient estimates, while the number of adult male members tends to have positive coefficient estimates. Since the number of adult male members constitutes the upper bound of male employment (abstracting from migration), the two variables are obviously

positively correlated. But the number of adult female members would be negatively correlated with male employment, if it happened to be the case that a household's need to earn additional income decreased as its labor resources (read: members of working ages) expanded.

As for the labor allocation portfolio of households, the regression results suggest that, in the case of male employment, the portfolios may have undergone frequent changes, at least relative to the industry affiliation of employed household members as of the first quarter of 1997. This would explain why the number of significant coefficient estimates of the industry affiliation variables (as of the first quarter of 1997) becomes fewer over time.

Interestingly, the coefficient estimate of having a household member who was a wage earner (as of the first quarter of 1997) is positive and significant in the first quarter, but turns negative and significant in the seventh quarter. This may indicate that the employment shocks of 1998 were absorbed mainly by the wage earners.

With regard to the education of household members, Table 6a shows that the average number of years of schooling of working-age household members of both sexes have unexpected negative and significant coefficient estimates. This may be because reservation wages may be poorly instrumented by the asset variables. As a result, the omitted variable effects of reservation wages are perhaps being reflected in the educational attainment variables.

In the case of the asset variables, the results indicate that ownership of sanitary facilities had a negative impact on male employment in quarters six to eight, whereas car ownership and non-labor income have significant coefficient estimates with opposing signs throughout the eight quarters. These results may imply that sanitary facilities and non-labor income are proxies of the reservation wage, while car ownership reflects the household's capability to support the job-search activities of its members.

As for the variables related to the household's social standing or the extensiveness of its information network, Table 6a suggests that male headship had a positive effect on the number of male members who were employed, perhaps because male heads tended to be well-informed about the available jobs for men. On the other hand, the age of the household head (as of the first quarter of 1997) had a concave impact on male employment for quarters three to eight, possibly because a family's information network expanded (though at a declining rate) with the age of the household head. Contrary to expectations, the years of schooling of the household head exerted a negative effect on the number of male members employed, although the net effect tended to be smaller in absolute value for households with male heads. Possibly, the unexpected signs of the household head's educational attainment (and, indeed, of the other education variables, as already mentioned) are due to inadequate proxy measures for household assets, which tended to be correlated with reservation wages.

In the case of female employment, Table 6b suggests that its geographic variation was larger than that of male employment. This is reflected in the greater number of coefficient estimates (of the locational variables) that are found to be significantly

different from that of NCR, the left out category, in each quarter. Moreover, the influences of the locational variables were apparently more systematic. More areas (e.g., Ilocos, Cagayan Valley, Western Visayas, and Northern Mindanao) had significant coefficient estimates (of the same sign) across the eight quarters under consideration.

With regard to the labor allocation portfolio of households, the results presented in Table 6b suggest that, in the case of female employment, the portfolio as captured by the industry affiliation of employed household members (during the first quarter of 1997 remained relatively stable. This is indicated by the number of significant coefficient estimates, which remains more or less constant over the eight quarters under consideration.

As for the household composition variables, Table 6b reports that the coefficient estimates of the number of young children are negative and significant through all eight quarters, whereas only for the sixth quarter is the coefficient estimate of the number of school-aged children positive and significant. Perhaps in the case of women, the presence of preschool children constrained them to undertake childcare activities, whereas the presence of school-aged children (particularly at a time of crisis) motivated them to find employment to supplement the earnings of male members. As in the case of men, the number of adult members of the opposite sex tended to have a negative effect on employment.

Interestingly, the average number of years of schooling of male household members of working-ages tended to show unexpected negative and significant coefficient estimates, whereas the average number of years of schooling of female members of working ages tended to have positive and significant coefficient estimates. Perhaps the educational attainments of males were correlated with the reservation wages of females, but female education had an empowering effect on women, which was manifested in female employment.

In the case of the household resources variables, Table 6b shows that access to sanitary facilities, having a house of predominantly strong materials, and car ownership tended to have a positive impact on female employment, whereas non-labor income had a negative and significant impact. Perhaps in the case of women, security in the home environment (in the sense of reduced health risks and ownership of a well-built house) had a liberating effect (from childcare responsibilities) and allowed them to explore and exploit employment opportunities.

On the variables related to the household's social standing or the extensiveness of its information network, Table 6b indicates that, unlike in the case of the male employment, male headship tended to have a negative effect on the employment level of female members, perhaps because male heads tended to be ill-informed about job vacancies for women. On the other hand, just as in the case of the men, the age of the household head (as of the first quarter of 1997) had a concave effect on female employment from the third to the eighth quarter. Interestingly, the years of schooling of the household head exerts a positive effect on female employment when the household head is female, but a negative effect when the household head is male. This finding implies that female, but not male, heads tend to be supportive of female employment.

Table 6a
OLS Regressions of the Number of Employed Male Members of the Household

Variables	First Quarter		Second Quarter		Third Quarter		Fourth Quarter	
	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors
Ilocos	0.136565	0.054 *	0.016573	0.068	0.101131	0.071	0.107602	0.071
Cagayan Valley	0.107713	0.050 *	0.106308	0.064	-0.002674	0.066	0.112602	0.066
Central Luzon	0.073206	0.051	0.015169	0.065	0.088351	0.068	0.171119	0.068 *
Southern Tagalog	-0.003816	0.046	-0.016411	0.058	-0.045802	0.060	0.089889	0.060
Bicol	0.030962	0.053	-0.091943	0.067	-0.061204	0.069	0.071732	0.069
Western Visayas	-0.034206	0.049	-0.096985	0.062	-0.092454	0.064	-0.017765	0.064
Central Visayas	-0.045042	0.053	-0.118007	0.067	-0.113925	0.069	-0.092640	0.069
Eastern Visayas	0.106207	0.056	0.073538	0.071	-0.082228	0.073	0.014013	0.073
Western Mindanao	-0.012383	0.057	-0.126900	0.072	-0.058429	0.075	-0.143816	0.075
Northern Mindanao	0.136355	0.064 *	-0.052744	0.081	-0.023452	0.084	0.086376	0.084
Southern Mindanao	0.023869	0.057	0.005546	0.072	0.041229	0.075	0.056877	0.075
Central Mindanao	0.063996	0.056	0.021099	0.071	-0.116741	0.074	-0.015742	0.074
Cordillera Administrative Region	-0.010604	0.058	0.026743	0.074	-0.025779	0.076	-0.049759	0.077
Autonomous Region of Muslim Mindanao	0.024887	0.054	-0.068846	0.069	-0.085750	0.071	0.109402	0.072
Caraga	-0.006435	0.064	-0.079489	0.082	-0.098898	0.085	-0.017990	0.085
Ilocos x Urban	-0.090531	0.063	0.007865	0.080	-0.087368	0.083	-0.059232	0.083
Cagayan Valley x Urban	0.003019	0.069	-0.020978	0.088	0.093866	0.091	0.021094	0.092
Central Luzon x Urban	-0.095753	0.052	-0.119935	0.065	-0.110087	0.068	-0.117080	0.068
Southern Tagalog x Urban	-0.007617	0.044	-0.032731	0.056	0.004212	0.058	-0.096317	0.059
Bicol x Urban	-0.000305	0.063	0.119721	0.080	-0.040229	0.083	0.011275	0.083
Western Visayas x Urban	0.012254	0.054	0.042159	0.068	-0.030748	0.070	-0.076374	0.071
Central Visayas x Urban	0.033151	0.057	0.004139	0.072	-0.021381	0.075	0.024655	0.075
Eastern Visayas x Urban	-0.035212	0.065	-0.128035	0.082	-0.039102	0.085	-0.037556	0.086
Western Mindanao x Urban	0.016460	0.073	0.069350	0.092	-0.046088	0.096	0.132405	0.096
Northern Mindanao x Urban	-0.061778	0.072	0.063825	0.091	-0.031842	0.095	-0.085447	0.095
Southern Mindanao x Urban	-0.010257	0.063	0.000589	0.080	-0.098597	0.083	0.028230	0.083
Central Mindanao x Urban	-0.071102	0.076	-0.198440	0.096 *	-0.078249	0.100	-0.159669	0.100
Cordillera Administrative Region x Urban	0.110811	0.075	-0.018421	0.095	-0.043458	0.099	0.100978	0.099
Autonomous Region of Muslim Mindanao x Urban	0.112815	0.085	0.085479	0.108	0.248828	0.112 *	0.127325	0.112
Caraga x Urban	-0.163250	0.074 *	-0.094157	0.093	-0.053160	0.097	-0.138260	0.097
Number of children 6 years and younger	0.039631	0.008 **	0.024444	0.010 *	0.016546	0.010	0.005441	0.010
Number of children between 7 and 14 years old	0.007381	0.007	0.008153	0.008	0.003976	0.009	0.005280	0.009
Number of elderly household members	-0.010665	0.022	-0.018988	0.028	-0.032996	0.029	-0.045200	0.029

OLS Regressions of the Number of Employed Male Members o

Variables	Fifth Quarter		Sixth Quarter		Seventh Quarter		Eighth Quarter	
	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors
Ilocos	0.047933	0.074	0.071104	0.076	0.043579	0.076	0.124625	0.078
Cagayan Valley	0.073555	0.069	0.044008	0.071	0.078216	0.071	0.075433	0.073
Central Luzon'	0.040196	0.070	0.149717	0.072 *	0.116927	0.072	0.001549	0.074
Southern Tagalog	0.067008	0.063	0.011169	0.064	0.019776	0.064	0.054465	0.066
Bicol	-0.010622	0.072	0.002345	0.074	-0.105907	0.074	-0.035163	0.076
Western Visayas	-0.101492	0.067	-0.156417	0.069 *	-0.102267	0.069	-0.072039	0.071
Central Visayas	-0.146713	0.072 *	-0.090964	0.074	-0.181780	0.074 *	-0.127223	0.076
Eastern Visayas	-0.028542	0.076	0.040464	0.078	0.014575	0.078	-0.021920	0.080
Western Mindanao	-0.246629	0.078 **	-0.168513	0.080 *	-0.141192	0.080	-0.044071	0.083
Northern Mindanao	0.025075	0.087	-0.011798	0.090	-0.059608	0.090	0.008935	0.092
Southern Mindanao	-0.008195	0.078	-0.048283	0.080	-0.057647	0.080	0.043952	0.083
Central Mindanao	0.024724	0.077	0.074972	0.079	-0.128471	0.079	0.002657	0.082
Cordillera Administrative Region	-0.043363	0.079	0.047907	0.081	-0.052344	0.082	-0.115780	0.084
Autonomous Region of Muslim Mindanao	0.040310	0.074	0.008676	0.076	0.011460	0.076	0.014957	0.078
Caraga	-0.042794	0.088	-0.052540	0.090	-0.080059	0.091	-0.121264	0.093
Ilocos x Urban	-0.051273	0.086	-0.109226	0.088	-0.097921	0.088	-0.177111	0.091
Cagayan Valley x Urban	0.021547	0.095	0.124876	0.097	0.022985	0.098	0.026236	0.100
Central Luzon x Urban	-0.069739	0.071	-0.218219	0.072 **	-0.158119	0.073 *	0.018809	0.075
Southern Tagalog x Urban	-0.117091	0.061	-0.067538	0.062	-0.045493	0.063	-0.031868	0.064
Bicol x Urban	-0.012973	0.086	-0.053349	0.089	0.080134	0.089	-0.078992	0.091
Western Visayas x Urban	-0.057800	0.073	0.022661	0.075	-0.084847	0.075	-0.032361	0.078
Central Visayas x Urban	0.107573	0.078	-0.056965	0.080	-0.016997	0.080	-0.023512	0.083
Eastern Visayas x Urban	0.036121	0.089	-0.009542	0.091	-0.124249	0.091	-0.032212	0.094
Western Mindanao x Urban	0.161078	0.100	0.141347	0.102	0.096884	0.102	0.118256	0.105
Northern Mindanao x Urban	-0.026111	0.099	0.064562	0.101	0.017988	0.102	-0.031249	0.104
Southern Mindanao x Urban	0.041581	0.087	0.063235	0.089	0.116872	0.089	0.019492	0.092
Central Mindanao x Urban	-0.211637	0.104 *	-0.291725	0.107 **	-0.176446	0.107	-0.221665	0.110 *
Cordillera Administrative Region x Urban	0.038441	0.103	-0.089023	0.106	-0.029132	0.106	0.056493	0.109
Autonomous Region of Muslim Mindanao x Urban	0.089204	0.116	0.217667	0.119	0.034371	0.120	0.127332	0.123
Caraga x Urban	-0.095084	0.101	-0.117757	0.103	-0.186269	0.104	-0.004353	0.106
Number of children 6 years and younger	0.004079	0.010	0.009171	0.011	0.010149	0.011	0.014531	0.011
Number of children between 7 and 14 years old	0.009997	0.009	0.028102	0.009 **	0.029257	0.009 **	0.030394	0.009 **
Number of elderly household members	-0.024209	0.030	-0.038691	0.031	-0.010873	0.031	-0.012780	0.032
Number of adult males (other than household head, if male)	0.423670	0.015 **	0.432753	0.015 **	0.431945	0.015 **	0.414239	0.016 **
Number of adult females (other than household head, if female)	-0.025809	0.013 *	-0.020989	0.013	-0.009688	0.013	0.005219	0.014

Table 6a (continued)
OLS Regressions of the Number of Employed Male Members of the Household

Variables	First Quarter		Second Quarter		Third Quarter		Fourth Quarter	
	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors
A household member is affiliated with								
Agriculture, fishery, and forestry	0.513814	0.021 **	0.304699	0.027 **	0.234385	0.028 **	0.235873	0.028 **
Mining and quarrying	0.399152	0.080 **	0.172350	0.102	0.017322	0.105	0.045087	0.106
Manufacturing	0.305566	0.025 **	0.145473	0.032 **	0.061625	0.033	0.109711	0.033 **
Electricity, gas, and water	0.283494	0.076 **	0.207519	0.097 *	0.172354	0.100	0.112932	0.101
Construction	0.363734	0.028 **	0.192111	0.036 **	0.191802	0.037 **	0.135255	0.037 **
Wholesale and retail trade	0.186773	0.020 **	0.133991	0.026 **	0.119472	0.026 **	0.047233	0.027
Transportation, storage, and communication	0.369671	0.025 **	0.210141	0.032 **	0.162233	0.033 **	0.144833	0.033 **
Financing, insurance, real estate, and business services	0.191582	0.041 **	0.024410	0.052	0.076569	0.054	0.055748	0.054
Community, social, and personal services	0.258160	0.022 **	0.130367	0.028 **	0.087529	0.029 **	0.093476	0.029 **
A household member is a wage earner	0.090870	0.020 **	0.026657	0.025	0.013626	0.026	0.013969	0.026
Average years of schooling of male household members	-0.021123	0.002 **	-0.016151	0.003 **	-0.014702	0.003 **	-0.013723	0.003 **
Average years of schooling of female household members	-0.012700	0.003 **	-0.007535	0.003 *	-0.011684	0.003 **	-0.005464	0.003
House has sanitary water and water-sealed toilet facilities	0.002666	0.022	-0.003092	0.028	-0.044499	0.029	-0.017728	0.029
House is predominantly made of strong materials	-0.017673	0.018	-0.010292	0.022	-0.013956	0.023	-0.021008	0.023
Household has a car	0.076708	0.029 **	0.095219	0.037 *	0.112754	0.038 **	0.077460	0.039 *
Nonlabor income (in thousands)	-0.000306	0.000 **	-0.000646	0.000 **	-0.000791	0.000 **	-0.000741	0.000 **
Male headed household	0.570487	0.051 **	0.566152	0.065 **	0.469683	0.067 **	0.502063	0.067 **
Age of household head	-0.003531	0.004	0.000264	0.005	0.013496	0.006 *	0.016460	0.006 **
Square of age of household head	0.000046	0.000	0.000000	0.000	-0.000137	0.000 *	-0.000162	0.000 **
Years of schooling of household head	-0.025548	0.006 **	-0.037745	0.008 **	-0.030066	0.008 **	-0.018635	0.008 *
Male headed household x Years of schooling of household head	0.021456	0.006 **	0.023826	0.008 **	0.018293	0.008 *	0.008464	0.008
Constant	0.048308	0.111	0.313933	0.141 *	0.285377	0.146	0.103125	0.146
R^2	0.6276		0.4721		0.3627		0.3587	
Adjusted R^2	0.6228		0.4652		0.3544		0.3503	
Number of Observations	4332		4332		4332		4332	

* - significant at .05 level.
** - significant at .01 level.

Table 6a (continued)
OLS Regressions of the Number of Employed Male Members o

Variables	Fifth Quarter		Sixth Quarter		Seventh Quarter		Eighth Quarter	
	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors
A household member is affiliated with								
Agriculture, fishery, and forestry	0.240468	0.029 **	0.207346	0.030 **	0.216949	0.030 **	0.230859	0.031 **
Mining and quarrying	-0.050608	0.109	0.048211	0.112	0.087353	0.113	0.188957	0.116
Manufacturing	0.153737	0.034 **	0.143209	0.035 **	0.087605	0.035 *	0.077474	0.036 *
Electricity, gas, and water	0.155269	0.104	0.050072	0.107	0.192909	0.107	0.229223	0.110 *
Construction	0.133244	0.039 **	0.156634	0.040 **	0.143946	0.040 **	0.138276	0.041 **
Wholesale and retail trade	0.060256	0.028 *	0.039771	0.028	0.047150	0.028	0.032937	0.029
Transportation, storage, and communication	0.141759	0.035 **	0.129937	0.036 **	0.149928	0.036 **	0.152420	0.037 **
Financing, insurance, real estate, and business services	0.060239	0.056	-0.013915	0.058	-0.036635	0.058	-0.062836	0.060
Community, social, and personal services	0.082170	0.030 **	0.130638	0.031 **	0.119073	0.031 **	0.061235	0.032
A household member is a wage earner	-0.019429	0.027	-0.045513	0.028	-0.061846	0.028 *	-0.050171	0.029
Average years of schooling of male household members	-0.009429	0.003 **	-0.010658	0.003 **	-0.011991	0.003 **	-0.009559	0.003 **
Average years of schooling of female household members	-0.006279	0.004	-0.007062	0.004	-0.007961	0.004 *	-0.006807	0.004
House has sanitary water and water-sealed toilet facilities	-0.021019	0.030	-0.067327	0.030 *	-0.060996	0.031 *	-0.072015	0.031 *
House is predominantly made of strong materials	-0.000138	0.024	-0.021620	0.025	-0.018198	0.025	0.017898	0.025
Household has a car	0.124482	0.040 **	0.089705	0.041 *	0.097933	0.041 *	0.097018	0.042 *
Nonlabor income (in thousands)	-0.000689	0.000 **	-0.000823	0.000 **	-0.000970	0.000 **	-0.000873	0.000 **
Male headed household	0.449557	0.070 **	0.544203	0.072 **	0.520744	0.072 **	0.427164	0.074 **
Age of household head	0.018166	0.006 **	0.016333	0.006 **	0.015096	0.006 *	0.015759	0.006 *
Square of age of household head	-0.000202	0.000 **	-0.000167	0.000 **	-0.000165	0.000 **	-0.000181	0.000 **
Years of schooling of household head	-0.031742	0.008 **	-0.021674	0.009 *	-0.014652	0.009	-0.020524	0.009 *
Male headed household x Years of schooling of household head	0.018961	0.009 *	0.010933	0.009	0.006121	0.009	0.014555	0.009
Constant	0.212121	0.152	0.142301	0.156	0.203027	0.156	0.196313	0.161
R^2	0.3253		0.3257		0.3152		0.2908	
Adjusted R^2	0.3165		0.3169		0.3062		0.2816	
Number of Observations	4332		4332		4332		4332	

* - significant at .05 level.
** - significant at .01 level.

Table 6b
OLS Regressions of the Number of Employed Female Members of the Household

Variables	First Quarter		Second Quarter		Third Quarter		Fourth Quarter	
	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors
Ilocos	0.222360	0.059 **	0.170630	0.070 *	0.164652	0.069 *	0.146097	0.070 *
Cagayan Valley	0.317794	0.056 **	0.272895	0.067 **	0.127224	0.066	0.121960	0.067
Central Luzon	-0.011804	0.056	-0.060338	0.067	-0.138402	0.066 *	-0.057786	0.067
Southern Tagalog	0.017253	0.050	-0.073266	0.060	-0.076079	0.059	0.003018	0.060
Bicol	0.087355	0.059	0.158650	0.070 *	-0.039099	0.069	-0.032629	0.070
Western Visayas	0.201250	0.053 **	0.006426	0.063	0.139364	0.063 *	0.161029	0.063 *
Central Visayas	0.086585	0.059	0.103482	0.071	0.051158	0.070	0.040732	0.071
Eastern Visayas	0.063256	0.061	0.034235	0.073	-0.097998	0.072	-0.082482	0.073
Western Mindanao	-0.074653	0.064	-0.024822	0.076	-0.145611	0.075	-0.109952	0.075
Northern Mindanao	0.346716	0.071 **	0.318873	0.085 **	0.238338	0.084 **	0.365165	0.084 **
Southern Mindanao	0.028740	0.063	0.126772	0.075	0.111872	0.075	0.042500	0.075
Central Mindanao	0.158199	0.062 *	0.107979	0.074	0.110974	0.073	0.199505	0.074 **
Cordillera Administrative Region	0.313518	0.064 **	0.217228	0.077 **	0.186785	0.076 *	0.120841	0.076
Autonomous Region of Muslim Mindanao	-0.059289	0.059	-0.182774	0.071 **	-0.201786	0.070 **	-0.164210	0.071 *
Caraga	0.298813	0.071 **	0.292829	0.084 **	0.163018	0.083	0.207060	0.084 *
Ilocos x Urban	-0.135772	0.068 *	-0.151530	0.081	-0.252796	0.080 **	-0.275562	0.081 **
Cagayan Valley x Urban	-0.178495	0.076 *	-0.002824	0.090	-0.007130	0.089	0.028340	0.090
Central Luzon x Urban	0.008375	0.057	0.011587	0.067	0.121343	0.067	0.004988	0.067
Southern Tagalog x Urban	0.056949	0.049	0.120928	0.058 *	0.053994	0.058	0.043530	0.058
Bicol x Urban	0.009209	0.069	-0.163358	0.082 *	0.066822	0.082	0.075510	0.082
Western Visayas x Urban	-0.157891	0.058 **	-0.022624	0.069	-0.164162	0.069 *	-0.107693	0.069
Central Visayas x Urban	0.012067	0.064	-0.059238	0.076	-0.071787	0.076	-0.029747	0.076
Eastern Visayas x Urban	0.069889	0.072	0.076711	0.086	0.160760	0.085	0.185666	0.086 *
Western Mindanao x Urban	0.028101	0.081	0.003576	0.096	0.003985	0.095	0.078048	0.096
Northern Mindanao x Urban	-0.116624	0.080	-0.197307	0.096 *	-0.178271	0.095	-0.246294	0.096 **
Southern Mindanao x Urban	0.086357	0.070	-0.018643	0.083	-0.049706	0.083	0.019940	0.083
Central Mindanao x Urban	-0.069094	0.084	-0.132756	0.100	-0.051068	0.099	-0.181663	0.100
Cordillera Administrative Region x Urban	-0.319221	0.081 **	-0.148839	0.097	-0.206953	0.096 *	-0.202216	0.097 *
Autonomous Region of Muslim Mindanao x Urban	0.009527	0.093	0.021635	0.111	-0.062872	0.110	-0.045941	0.111
Caraga x Urban	-0.067252	0.081	-0.207148	0.097 *	-0.089661	0.096	-0.196300	0.096 *
Number of children 6 years and younger	-0.036662	0.008 **	-0.035252	0.010 **	-0.029269	0.010 **	-0.047224	0.010 **
Number of children between 7 and 14 years old	0.009556	0.007	0.015510	0.009	0.006956	0.008	0.012279	0.009
Number of elderly household members	0.028935	0.025	0.002964	0.030	-0.046366	0.029	0.011088	0.030
Number of adult males (other than household head, if male)	0.084251	**						

OLS Regressions of the Number of Employed Female Members

Variables	Fifth Quarter		Sixth Quarter		Seventh Quarter		Eighth Quarter	
	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors
Ilocos	0.149486	0.069 *	0.078722	0.072	0.259557	0.068 **	0.127385	0.071
Cagayan Valley	0.174096	0.066 **	0.064105	0.069	0.202961	0.065 **	0.031948	0.068
Central Luzon	-0.028428	0.066	-0.119425	0.068	-0.009656	0.065	-0.154463	0.068 *
Southern Tagalog	0.003962	0.059	-0.032192	0.061	0.057826	0.058	-0.055487	0.061
Bicol	0.016912	0.069	0.071742	0.071	0.060716	0.068	-0.034416	0.071
Western Visayas	0.161821	0.063 *	0.098348	0.065	0.266258	0.062 **	0.127477	0.065 *
Central Visayas	0.135055	0.070	0.060777	0.072	0.281017	0.069 **	0.076886	0.072
Eastern Visayas	-0.021279	0.072	-0.069972	0.075	-0.096347	0.071	-0.116808	0.075
Western Mindanao	-0.110474	0.075	-0.182324	0.078 *	-0.028552	0.074	-0.090050	0.077
Northern Mindanao	0.380552	0.084 **	0.334119	0.087 **	0.364342	0.083 **	0.257357	0.086 **
Southern Mindanao	0.115184	0.075	-0.029621	0.077	0.186462	0.074 *	0.064666	0.077
Central Mindanao	0.134717	0.073	-0.037308	0.076	0.126952	0.072	0.073881	0.075
Cordillera Administrative Region	0.213725	0.076 **	0.223378	0.079 **	0.192817	0.075 *	0.033485	0.078
Autonomous Region of Muslim Mindanao	-0.085227	0.070	-0.205570	0.072 **	-0.086127	0.069	-0.229333	0.072 **
Caraga	0.233570	0.083 **	0.237176	0.086 **	0.274454	0.082 **	0.176074	0.086 *
Ilocos x Urban	-0.256842	0.080 **	-0.217883	0.083 **	-0.284108	0.079 **	-0.349508	0.083 **
Cagayan Valley x Urban	0.057486	0.089	0.134689	0.092	-0.033652	0.088	0.102116	0.092
Central Luzon x Urban	0.026254	0.067	0.069740	0.069	0.065855	0.066	0.065223	0.069
Southern Tagalog x Urban	0.089868	0.057	0.110574	0.060	0.063995	0.057	0.016332	0.059
Bicol x Urban	0.046695	0.082	0.014875	0.085	0.142856	0.081	0.075165	0.084
Western Visayas x Urban	-0.101929	0.069	-0.072989	0.071	-0.250632	0.068 **	-0.252334	0.071 **
Central Visayas x Urban	-0.028628	0.076	-0.051029	0.079	-0.124774	0.075	-0.056900	0.078
Eastern Visayas x Urban	0.148893	0.085	0.188022	0.088 *	0.242364	0.084 **	0.295695	0.088 **
Western Mindanao x Urban	0.113133	0.095	0.300921	0.099 **	-0.007703	0.094	-0.061852	0.098
Northern Mindanao x Urban	-0.209933	0.095 *	-0.058388	0.098	-0.241313	0.094 **	-0.081626	0.098
Southern Mindanao x Urban	-0.017936	0.083	0.150546	0.086	-0.021144	0.082	0.015833	0.085
Central Mindanao x Urban	0.029802	0.099	0.112757	0.103	-0.087467	0.098	-0.263807	0.102 *
Cordillera Administrative Region x Urban	-0.225761	0.096 *	-0.150663	0.099	-0.127295	0.095	-0.011094	0.099
Autonomous Region of Muslim Mindanao x Urban	-0.081193	0.110	-0.061298	0.114	-0.038186	0.109	0.001252	0.113
Caraga x Urban	-0.057261	0.096	-0.098235	0.099	-0.135010	0.095	-0.192922	0.099
Number of children 6 years and younger	-0.050580	0.010 **	-0.042372	0.010 **	-0.033027	0.010 **	-0.038688	0.010 **
Number of children between 7 and 14 years old	0.007131	0.008	0.024279	0.009 **	0.015363	0.008	0.015780	0.009
Number of elderly household members	-0.023864	0.029	0.000614	0.030	-0.001308	0.029	-0.019371	0.030
Number of adult males (other than household head, if male)	-0.043077	0.014 **	-0.023961	0.015	-0.032687	0.014 *	-0.034207	0.015 *
Number of adult females (other than household head, if female)	0.194980	0.012 **	0.206108	0.013 **	0.184620	0.012 **	0.188692	0.013 **

Table 6b (continued)
OLS Regressions of the Number of Employed Female Members of the Household

Variables	First Quarter		Second Quarter		Third Quarter		Fourth Quarter	
	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors
A household member is affiliated with								
Agriculture, fishery, and forestry	0.516869	0.024 **	0.339501	0.028 **	0.251539	0.028 **	0.261821	0.028 **
Mining and quarrying	0.223770	0.093 *	0.077454	0.111	-0.014556	0.110	0.146246	0.111
Manufacturing	0.529585	0.028 **	0.333630	0.033 **	0.274630	0.032 **	0.300013	0.033 **
Electricity, gas, and water	0.265019	0.086 **	0.273978	0.102 **	0.290199	0.101 **	0.230516	0.102 *
Construction	0.241124	0.032 **	0.140283	0.038 **	0.141733	0.038 **	0.136456	0.038 **
Wholesale and retail trade	0.658426	0.022 **	0.437382	0.026 **	0.369855	0.026 **	0.352171	0.026 **
Transportation, storage, and communication	0.226761	0.028 **	0.135393	0.034 **	0.056331	0.034	0.084046	0.034 *
Financing, insurance, real estate, and business services	0.498088	0.045 **	0.428430	0.054 **	0.290312	0.053 **	0.351409	0.054 **
Community, social, and personal services	0.606331	0.024 **	0.421020	0.029 **	0.335511	0.029 **	0.311991	0.029 **
A household member is a wage earner	-0.019778	0.022	-0.009595	0.026	-0.025188	0.026	-0.027073	0.026
Average years of schooling of male household members	-0.007341	0.003 **	-0.006216	0.003 *	-0.007341	0.003 *	-0.008155	0.003 **
Average years of schooling of female household members	0.000540	0.003	-0.000752	0.004	0.004179	0.004	0.007019	0.004 *
House has sanitary water and water-sealed toilet facilities	0.047272	0.024 *	0.052663	0.028	0.058688	0.028 *	0.061840	0.028 *
House is predominantly made of strong materials	-0.011579	0.019	0.017752	0.023	0.046420	0.023 *	0.009549	0.023
Household has a car	0.064396	0.032 *	0.120559	0.039 **	0.133618	0.038 **	0.129713	0.038 **
Nonlabor income (in thousands)	-0.000380	0.000 **	-0.000430	0.000 **	-0.000400	0.000 **	-0.000545	0.000 **
Male headed household	-0.350445	0.054 **	-0.402856	0.064 **	-0.232083	0.063 **	-0.304271	0.064 **
Age of household head	0.006628	0.005	0.008967	0.006	0.014810	0.006 **	0.018163	0.006 **
Square of age of household head	-0.000042	0.000	-0.000069	0.000	-0.000119	0.000 *	-0.000172	0.000 **
Years of schooling of household head	0.017482	0.006 **	0.009148	0.007	0.015251	0.007 *	0.013703	0.007
Male headed household x Years of schooling of household head	-0.023153	0.006 **	-0.016340	0.007 *	-0.023378	0.007 **	-0.020314	0.007 **
Constant	-0.165243	0.125	-0.001311	0.148	-0.093789	0.147	-0.082644	0.148
R^2	0.4644		0.3269		0.2425		0.2483	
Adjusted R^2	0.4575		0.3182		0.2327		0.2387	
Number of Observations	4413		4413		4413		4413	

* - significant at .05 level.
** - significant at .01 level.

6.2 Vulnerability to employment shocks

In the previous subsection, the regression results were presented and interpreted with employment at the household level as the dependent variable. Estimating the parameters of (2.1) to (2.8), however, is only an intermediate and peripheral concern of this paper. The more important objective involves identifying those household characteristics that indicate vulnerability to employment shocks. In other words, our primary interest is to estimate the coefficients of (3.1) to (3.4).

With this end in mind, two sets of estimates of the parameters of (3.1) to (3.4) are presented in this section. Tables 7a and 7b contain the estimates that are derived from OLS regressions of employment levels, the results of which were reported in Tables 6a and 6b. Tables 8a and 8b, on the other hand, report the estimates that are directly obtained from OLS regressions with four-quarter differences of employment levels as the dependent variable.

Notice, however, that the coefficient estimates of the two sets of tables are identical, although the standard errors reported in the second set of tables are smaller. As discussed in section 4, this is because direct OLS estimation of (3.1) to (3.4) (compared to differencing the coefficient estimates of (2.1) to (2.8)) does not reduce bias of the coefficient estimates. Neither does it treat the heteroscedasticity of the error variances.[11] Rather, doing so tends to reduce the standard errors of the estimates. Hence, in the discussion that follows, attention is restricted to the results reported in Tables 8a and 8b.

Which of their specified characteristics (as of the first quarter of 1997) made households susceptible to employment shocks? In the case of male employment, Table 8a indicates that different factors explain employment-shock vulnerability in different quarters. Indeed, only for one variable—having a wage earner among household members—are the coefficient estimates in all four quarters found to be statistically significant.

Among the dummy variables indicating the location of residence, only three areas had effects that were found to be statistically different from that of NCR, the left out region. These were Western Mindanao in the first quarter, urban areas in Southern Mindanao in the third quarter (which showed a positive coefficient estimate), and Central Luzon. Thus, in general, the employment shocks were apparently not area-specific. Moreover, perhaps because of the *El Niño* dry spell, rural and predominantly agricultural regional economies were not spared either.

As for the household composition variables, the results presented in Table 8a show that the number of preschool children increased the employment-shock vulnerability of male household members in the first quarter, which is in line with expectations, but the number of school-aged children had an insulating effect in all but the first quarter, which is contrary to the hypothesis. Perhaps because the need for large, regular cash outlays (for schooling and related expenses) is greatest when school-aged children are present, the number of school-aged children in the household is correlated with job tenure for male members of the household. In other words, perhaps male members of working age tend to find permanent jobs when the household membership includes children who are 7 to 14 years old.

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[11] Indeed, the results of the Cook-Weisberg tests indicate once more the prescence of heteroscedasticity in all four quarters, so that White standard errors are again generated, as in the regressions on employement level.

Table 7a
Household Vulnerability to Male Employment

Variables	First Quarter		Second Quarter		Third Quarter		Fourth Quarter	
	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors
Ilocos	-0.088632	0.091	0.054531	0.102	-0.057552	0.104	0.017023	0.105
Cagayan Valley	-0.034158	0.085	-0.062300	0.095	0.080890	0.097	-0.037169	0.099
Central Luzon	-0.033010	0.087	0.134548	0.097	0.028577	0.099	-0.169569	0.101
Southern Tagalog	0.070825	0.078	0.027581	0.087	0.065578	0.088	-0.035424	0.090
Bicol	-0.041584	0.089	0.094288	0.099	-0.044703	0.101	-0.106896	0.103
Western Visayas	-0.067286	0.083	-0.059432	0.092	-0.009813	0.094	-0.054274	0.096
Central Visayas	-0.101671	0.089	0.027042	0.100	-0.067854	0.101	-0.034584	0.103
Eastern Visayas	-0.134749	0.094	-0.033074	0.105	0.096803	0.107	-0.035933	0.109
Western Mindanao	-0.234246	0.097 *	-0.041613	0.108	-0.082763	0.110	0.099745	0.112
Northern Mindanao	-0.111280	0.108	0.040946	0.121	-0.036157	0.123	-0.077441	0.125
Southern Mindanao	-0.032065	0.097	-0.053829	0.108	-0.098876	0.110	-0.012925	0.112
Central Mindanao	-0.039272	0.095	0.053873	0.107	-0.011730	0.109	0.018399	0.110
Cordillera Administrative Region	-0.032760	0.098	0.021164	0.110	-0.026565	0.112	-0.066021	0.114
Autonomous Region of Muslim Mindanao	0.015423	0.092	0.077523	0.103	0.097209	0.104	-0.094445	0.106
Caraga	-0.036359	0.109	0.026949	0.122	0.018839	0.124	-0.103273	0.126
Ilocos x Urban	0.039258	0.106	-0.117091	0.119	-0.010553	0.121	-0.117879	0.123
Cagayan Valley x Urban	0.018527	0.118	0.145855	0.131	-0.070881	0.134	0.005141	0.136
Central Luzon x Urban	0.026013	0.087	-0.098284	0.098	-0.048032	0.099	0.135889	0.101
Southern Tagalog x Urban	-0.109475	0.075	-0.034807	0.084	-0.049705	0.086	0.064449	0.087
Bicol x Urban	-0.012668	0.107	-0.173070	0.120	0.120363	0.122	-0.090267	0.124
Western Visayas x Urban	-0.070054	0.091	-0.019498	0.101	-0.054099	0.103	0.044013	0.105
Central Visayas x Urban	0.074422	0.097	-0.061104	0.108	0.004384	0.110	-0.048166	0.112
Eastern Visayas x Urban	0.071334	0.110	0.118492	0.123	-0.085147	0.125	0.005344	0.127
Western Mindanao x Urban	0.144619	0.123	0.071998	0.138	0.142971	0.140	-0.014149	0.142
Northern Mindanao x Urban	0.035668	0.122	0.000736	0.137	0.049830	0.139	0.054197	0.141
Southern Mindanao x Urban	0.051838	0.107	0.062646	0.120	0.215468	0.122	-0.008739	0.124
Central Mindanao x Urban	-0.140535	0.129	-0.093285	0.144	-0.098197	0.146	-0.061996	0.149
Cordillera Administrative Region x Urban	-0.072370	0.127	-0.070602	0.142	0.014326	0.145	-0.044486	0.147
Autonomous Region of Muslim Mindanao x Urban	-0.023611	0.144	0.132187	0.161	-0.214457	0.164	0.000007	0.166
Caraga x Urban	0.068166	0.125	-0.023600	0.139	-0.133109	0.142	0.133907	0.144
Number of children 6 years and younger	-0.035552	0.013 **	-0.015273	0.014	-0.006397	0.015	0.009090	0.015
Number of children between 7 and 14 years old	0.002616	0.011	0.019949	0.012	0.025280	0.013 *	0.025114	0.013 *
Number of elderly household members	-0.013544	0.038	-0.019703	0.042	0.022123	0.043	0.032420	0.044
Number of adult males (other than household head, if male)	-0.144700	0.018 **	-0.122299	0.020 **	-0.018229	0.021	-0.042837	0.021 *

Household Vulnerability to Male Employment

Variables	First Quarter		Second Quarter		Third Quarter		Fourth Quarter	
	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors
A household member is affiliated with								
Agriculture, fishery, and forestry	-0.273346	0.036 **	-0.097353	0.041 *	-0.017436	0.041	-0.005013	0.042
Mining and quarrying	-0.449761	0.136 **	-0.124138	0.151	0.070031	0.154	0.143870	0.157
Manufacturing	-0.151829	0.043 **	-0.002264	0.048	0.025980	0.048	-0.032237	0.049
Electricity, gas, and water	-0.128225	0.129	-0.157447	0.144	0.020555	0.147	0.116291	0.149
Construction	-0.230490	0.048 **	-0.035478	0.053	-0.047856	0.054	0.003022	0.055
Wholesale and retail trade	-0.126516	0.034 **	-0.094220	0.038 *	-0.072322	0.039	-0.014296	0.039
Transportation, storage, and communication	-0.227912	0.043 **	-0.080204	0.048	-0.012306	0.049	0.007587	0.050
Financing, insurance, real estate, and business services	-0.131343	0.070	-0.038325	0.078	-0.113204	0.079	-0.118584	0.081
Community, social, and personal services	-0.175989	0.037 **	0.000272	0.042	0.031544	0.043	-0.032241	0.043
A household member is a wage earner	-0.110299	0.034 **	-0.072170	0.038	-0.075471	0.038 *	-0.064139	0.039
Average years of schooling of male household members	0.011694	0.004 **	0.005493	0.005	0.002711	0.005	0.004164	0.005
Average years of schooling of female household members	0.006422	0.004	0.000472	0.005	0.003724	0.005	-0.001343	0.005
House has sanitary water and water-sealed toilet facilities	-0.023685	0.037	-0.064235	0.041	-0.016498	0.042	-0.054288	0.043
House is predominantly made of strong materials	0.017535	0.030	-0.011328	0.033	-0.004242	0.034	0.038906	0.034
Household has a car	0.047774	0.049	-0.005514	0.055	-0.014821	0.056	0.019558	0.057
Nonlabor income (in thousands)	-0.000383	0.000 *	-0.000177	0.000	-0.000179	0.000	-0.000132	0.000
Male headed household	-0.120930	0.086	-0.021949	0.097	0.051061	0.098	-0.074899	0.100
Age of household head	0.021697	0.007 **	0.016069	0.008 *	0.001601	0.008	-0.000701	0.008
Square of age of household head	-0.000249	0.000 **	-0.000167	0.000 *	-0.000027	0.000	-0.000019	0.000
Years of schooling of household head	-0.006194	0.010	0.016071	0.012	0.015415	0.012	-0.001888	0.012
Male headed household x Years of schooling of household head	-0.002495	0.011	-0.012892	0.012	-0.012172	0.012	0.006091	0.012
Constant	0.163813	0.188	-0.171633	0.210	-0.082350	0.214	0.093188	0.217
Number of Observations	4332		4332		4332		4332	

Notes:

1. The coefficient estimates reported in this table are the differences of the coefficient estimates between quarters t and $t - 4$, which were reported in Table 6.1a.
2. The standard errors of the coefficient estimates are calculated from the standard errors of Table 6.1a, using the following formula: $[se(t)2 + se(t - 4)2]1/2$.

* - significant at .05 level.
** - significant at .01 level.

Table 7b
Household Vulnerability to Female Employment

Variables	First Quarter		Second Quarter		Third Quarter		Fourth Quarter	
	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors
Ilocos	-0.072874	0.091	-0.091908	0.100	0.094904	0.097	-0.018712	0.100
Cagayan Valley	-0.143699	0.087	-0.208790	0.096 *	0.075737	0.093	-0.090012	0.095
Central Luzon	-0.016624	0.087	-0.059087	0.096	0.128746	0.093	-0.096677	0.095
Southern Tagalog	-0.013292	0.077	0.041074	0.085	0.133905	0.083	-0.058506	0.085
Bicol	-0.070443	0.090	-0.086908	0.100	0.099815	0.097	-0.001787	0.099
Western Visayas	-0.039429	0.082	0.091922	0.091	0.126894	0.088	-0.033552	0.091
Central Visayas	0.048470	0.092	-0.042706	0.101	0.229860	0.098 *	0.036155	0.101
Eastern Visayas	-0.084535	0.095	-0.104207	0.105	0.001650	0.102	-0.034326	0.104
Western Mindanao	-0.035821	0.098	-0.157502	0.108	0.117059	0.105	0.019903	0.108
Northern Mindanao	0.033836	0.110	0.015246	0.121	0.126003	0.118	-0.107808	0.121
Southern Mindanao	0.086445	0.098	-0.156393	0.108	0.074591	0.105	0.022166	0.108
Central Mindanao	-0.023483	0.096	-0.145287	0.106	0.015978	0.103	-0.125624	0.106
Cordillera Administrative Region	-0.099793	0.099	0.006150	0.110	0.006032	0.107	-0.087356	0.109
Autonomous Region of Muslim Mindanao	-0.025939	0.092	-0.022796	0.101	0.115659	0.098	-0.065122	0.101
Caraga	-0.065243	0.109	-0.055653	0.121	0.111436	0.117	-0.030986	0.120
Ilocos x Urban	-0.121070	0.105	-0.066352	0.116	-0.031313	0.113	-0.073946	0.115
Cagayan Valley x Urban	0.235982	0.117 *	0.137513	0.129	-0.026523	0.125	0.073776	0.129
Central Luzon x Urban	0.017879	0.087	0.058154	0.096	-0.055488	0.094	0.060236	0.096
Southern Tagalog x Urban	0.032920	0.075	-0.010354	0.083	0.010001	0.081	-0.027198	0.083
Bicol x Urban	0.037486	0.107	0.178234	0.118	0.076034	0.115	-0.000345	0.118
Western Visayas x Urban	0.055962	0.090	-0.050365	0.100	-0.086470	0.097	-0.144641	0.099
Central Visayas x Urban	-0.040695	0.099	0.008209	0.110	-0.052988	0.107	-0.027153	0.109
Eastern Visayas x Urban	0.079004	0.111	0.111311	0.123	0.081604	0.119	0.110029	0.122
Western Mindanao x Urban	0.085032	0.125	0.297345	0.138 *	-0.011688	0.134	-0.139900	0.137
Northern Mindanao x Urban	-0.093310	0.124	0.138919	0.137	-0.063041	0.133	0.164667	0.137
Southern Mindanao x Urban	-0.104293	0.108	0.169189	0.120	0.028562	0.116	-0.004106	0.119
Central Mindanao x Urban	0.098896	0.130	0.245513	0.144	-0.036399	0.140	-0.082143	0.143
Cordillera Administrative Region x Urban	0.093460	0.126	-0.001825	0.139	0.079658	0.135	0.191122	0.138
Autonomous Region of Muslim Mindanao x Urban	-0.090720	0.144	-0.082933	0.159	0.024686	0.155	0.047193	0.159
Caraga x Urban	0.009990	0.125	0.108913	0.138	-0.045349	0.135	0.003378	0.138
Number of children 6 years and younger	-0.013918	0.013	-0.007120	0.014	-0.003758	0.014	0.008535	0.014
Number of children between 7 and 14 years old	-0.002425	0.011	0.008768	0.012	0.008407	0.012	0.003501	0.012
Number of elderly household members	-0.052800	0.038	-0.002350	0.042	0.045057	0.041	-0.030459	0.042
Number of adult males (other than household head, if male)	0.041174	0.019 *	0.016907	0.021	-0.006424	0.020	0.008862	0.020

Variables	First Quarter		Second Quarter		Third Quarter		Fourth Quarter	
	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors
A household member is affiliated with								
Agriculture, fishery, and forestry	-0.257498	0.036 **	-0.130464	0.040 **	-0.032076	0.039	-0.043203	0.040
Mining and quarrying	-0.126342	0.144	-0.085679	0.159	0.042135	0.155	-0.041100	0.158
Manufacturing	-0.251286	0.043 **	-0.065291	0.047	-0.062071	0.046	-0.086817	0.047
Electricity, gas, and water	-0.086001	0.132	-0.067847	0.146	-0.090854	0.142	-0.012507	0.146
Construction	-0.153328	0.049 **	-0.045713	0.055	-0.047038	0.053	-0.034704	0.054
Wholesale and retail trade	-0.311300	0.034 **	-0.112088	0.037 **	-0.059406	0.036	-0.052728	0.037
Transportation, storage, and communication	-0.165259	0.044 **	-0.052044	0.048	-0.026197	0.047	-0.006437	0.048
Financing, insurance, real estate, and business services	-0.237167	0.070 **	-0.161564	0.077 *	-0.030826	0.075	-0.078936	0.077
Community, social, and personal services	-0.299945	0.038 **	-0.134127	0.042 **	-0.079404	0.040 *	-0.042313	0.042
A household member is a wage earner	-0.010287	0.034	-0.038670	0.038	0.015148	0.037	-0.007873	0.038
Average years of schooling of male household members	0.000764	0.004	-0.002768	0.004	0.001462	0.004	0.004493	0.004
Average years of schooling of female household members	0.007237	0.005	0.009432	0.005	0.006792	0.005	0.002912	0.005
House has sanitary water and water-sealed toilet facilities	0.031467	0.037	-0.005776	0.041	0.008679	0.039	-0.016720	0.040
House is predominantly made of strong materials	0.061873	0.030 *	0.000949	0.033	-0.012614	0.032	0.007358	0.033
Household has a car	0.036314	0.050	0.009057	0.055	-0.006569	0.054	0.003170	0.055
Nonlabor income (in thousands)	-0.000093	0.000	-0.000075	0.000	-0.000051	0.000	0.000178	0.000
Male headed household	0.105472	0.083	0.140031	0.092	0.029013	0.089	0.085863	0.091
Age of household head	0.014241	0.007 *	0.012911	0.008	0.005558	0.008	0.005588	0.008
Square of age of household head	-0.000152	0.000 *	-0.000133	0.000	-0.000069	0.000	-0.000056	0.000
Years of schooling of household head	0.001286	0.009	0.006782	0.010	-0.000238	0.010	0.001215	0.010
Male headed household x Years of schooling of household head	-0.001858	0.010	-0.008404	0.011	-0.004523	0.010	0.000286	0.011
Constant	-0.068372	0.192	-0.205345	0.212	-0.160495	0.206	-0.134581	0.212
Number of Observations	4413		4413		4413		4413	

Notes:

1. The coefficient estimates reported in this table are the differences of the coefficient estimates between quarters+A33 t and t - 4, which were reported in Table 6.1b.
2. The standard errors of the coefficient estimates are calculated from the standard errors of Table 6.1b, using the following formula: [se(t)2 + se(t - 4)2]1/2.

* - significant at .05 level.
** - significant at .01 level.

Table 8a
Household Vulnerability to Male Empioyment

Variables	First Quarter		Second Quarter		Third Quarter		Fourth Quarter	
	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors
Ilocos	-0.088632	0.076	0.054531	0.078	-0.057552	0.071	0.017023	0.073
Cagayan Valley	-0.034158	0.072	-0.062300	0.073	0.080890	0.067	-0.037169	0.069
Central Luzon	-0.033010	0.073	0.134548	0.075	0.028577	0.068	-0.169569	0.070 *
Southern Tagalog	0.070825	0.065	0.027581	0.067	0.065578	0.061	-0.035424	0.063
Bicol	-0.041584	0.075	0.094288	0.076	-0.044703	0.070	-0.106896	0.072
Western Visayas	-0.067286	0.070	-0.059432	0.071	-0.009813	0.065	-0.054274	0.067
Central Visayas	-0.101671	0.075	0.027042	0.077	-0.067854	0.070	-0.034584	0.072
Eastern Visayas	-0.134749	0.079	-0.033074	0.081	0.096803	0.074	-0.035933	0.076
Western Mindanao	-0.234246	0.081 **	-0.041613	0.083	-0.082763	0.076	0.099745	0.078
Northern Mindanao	-0.111280	0.091	0.040947	0.093	-0.036157	0.085	-0.077441	0.087
Southern Mindanao	-0.032065	0.081	-0.053829	0.083	-0.098876	0.076	-0.012925	0.078
Central Mindanao	-0.039272	0.080	0.053873	0.082	-0.011730	0.075	0.018399	0.077
Cordillera Administrative Region	-0.032760	0.083	0.021164	0.084	-0.026565	0.077	-0.066021	0.079
Autonomous Region of Muslim Mindanao	0.015423	0.077	0.077523	0.079	0.097209	0.072	-0.094445	0.074
Caraga	-0.036359	0.092	0.026949	0.094	0.018839	0.085	-0.103273	0.088
Ilocos x Urban	0.039258	0.089	-0.117091	0.091	-0.010553	0.083	-0.117879	0.086
Cagayan Valley x Urban	0.018528	0.099	0.145855	0.101	-0.070881	0.092	0.005141	0.095
Central Luzon x Urban	0.026013	0.073	-0.098284	0.075	-0.048032	0.068	0.135889	0.070
Southern Tagalog x Urban	-0.109475	0.063	-0.034807	0.065	-0.049705	0.059	0.064449	0.061
Bicol x Urban	-0.012668	0.090	-0.173070	0.092	0.120363	0.084	-0.090267	0.086
Western Visayas x Urban	-0.070054	0.076	-0.019498	0.078	-0.054099	0.071	0.044013	0.073
Central Visayas x Urban	0.074422	0.081	-0.061104	0.083	0.004384	0.076	-0.048166	0.078
Eastern Visayas x Urban	0.071334	0.092	0.118492	0.094	-0.085147	0.086	0.005344	0.089
Western Mindanao x Urban	0.144619	0.104	0.071998	0.106	0.142971	0.097	-0.014149	0.099
Northern Mindanao x Urban	0.035668	0.103	0.000736	0.105	0.049830	0.096	0.054198	0.099
Southern Mindanao x Urban	0.051838	0.090	0.062646	0.092	0.215468	0.084 *	-0.008739	0.086
Central Mindanao x Urban	-0.140535	0.108	-0.093285	0.110	-0.098197	0.101	-0.061996	0.104
Cordillera Administrative Region x Urban	-0.072370	0.107	-0.070602	0.109	0.014326	0.100	-0.044486	0.103
Autonomous Region of Muslim Mindanao x Urban	-0.023611	0.121	0.132187	0.124	-0.214457	0.113	0.000007	0.116
Caraga x Urban	0.068166	0.105	-0.023600	0.107	-0.133109	0.098	0.133907	0.100
Number of children 6 years and younger	-0.035552	0.011 **	-0.015273	0.011	-0.006397	0.010	0.009090	0.010
Number of children between 7 and 14 years old	0.002616	0.009	0.019949	0.009 *	0.025280	0.009 **	0.025114	0.009 **
Number of elderly household members	-0.013544	0.032	-0.019703	0.032	0.022123	0.029	0.032420	0.030
Number of adult males (other than household head, if male)	-0.144700	0.015 **	-0.122299	0.016 **	-0.018229	0.014	0.042827	0.016 **

Variables	First Quarter		Second Quarter		Third Quarter		Fourth Quarter	
	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors
A household member is affiliated with								
Agriculture, fishery, and forestry	-0.273346	0.031 **	-0.097353	0.031 **	-0.017436	0.028	-0.005013	0.029
Mining and quarrying	-0.449761	0.114 **	-0.124138	0.116	0.070031	0.106	0.143870	0.109
Manufacturing	-0.151829	0.036 **	-0.002264	0.037	0.025980	0.033	-0.032237	0.034
Electricity, gas, and water	-0.128225	0.108	-0.157447	0.111	0.020555	0.101	0.116291	0.104
Construction	-0.230490	0.040 **	-0.035478	0.041	-0.047856	0.037	0.003022	0.039
Wholesale and retail trade	-0.126516	0.029 **	-0.094220	0.029 **	-0.072322	0.027 **	-0.014296	0.027
Transportation, storage, and communication	-0.227912	0.036 **	-0.080204	0.037 *	-0.012306	0.034	0.007587	0.035
Financing, insurance, real estate, and business services	-0.131343	0.059 *	-0.038325	0.060	-0.113204	0.055 *	-0.118584	0.056 *
Community, social, and personal services	-0.175989	0.031 **	0.000272	0.032	0.031544	0.029	-0.032241	0.030
A household member is a wage earner	-0.110299	0.028 **	-0.072170	0.029 *	-0.075471	0.026 **	-0.064139	0.027 *
Average years of schooling of male household members	0.011694	0.003 **	0.005493	0.003	0.002711	0.003	0.004164	0.003
Average years of schooling of female household members	0.006422	0.004	0.000472	0.004	0.003724	0.003	-0.001343	0.004
House has sanitary water and water-sealed toilet facilities	-0.023685	0.031	-0.064235	0.032 *	-0.016498	0.029	-0.054288	0.030
House is predominantly made of strong materials	0.017535	0.025	-0.011328	0.026	-0.004242	0.023	0.038906	0.024
Household has a car	0.047775	0.042	-0.005514	0.043	-0.014821	0.039	0.019558	0.040
Nonlabor income (in thousands)	-0.000383	0.000 *	-0.000177	0.000	-0.000179	0.000	-0.000132	0.000
Male headed household	-0.120930	0.073	-0.021949	0.074	0.051061	0.068	-0.074899	0.070
Age of household head	0.021697	0.006 **	0.016069	0.006 *	0.001601	0.006	-0.000701	0.006
Square of age of household head	-0.000249	0.000 **	-0.000167	0.000 **	-0.000027	0.000	-0.000019	0.000
Years of schooling of household head	-0.006194	0.009	0.016070	0.009	0.015415	0.008	-0.001888	0.008
Male headed household x Years of schooling of household head	-0.002495	0.009	-0.012892	0.009	-0.012172	0.008	0.006091	0.009
Constant	0.163813	0.158	-0.171633	0.161	-0.082350	0.147	0.093188	0.152
R^2	0.0973		0.0492		0.0204		0.0220	
Adjusted R^2	0.0854		0.0367		0.0076		0.0092	
Number of Observations	4332		4332		4332		4332	

Notes:

1. The coefficient estimates reported in this table are the differences of the coefficient estimates between quarters t and t - 4, which were directly estimated by OLS.
2. The standard errors of the coefficient estimates are directly estimated from the OLS regressions.

* - significant at .05 level.

** - significant at .01 level.

Table 8b
Household Vulnerability to Female Employment

Variables	First Quarter		Second Quarter		Third Quarter		Fourth Quarter	
	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors
Ilocos	-0.072874	0.070	-0.091908	0.075	0.094904	0.066	-0.018712	0.068
Cagayan Valley	-0.143699	0.067 *	-0.208790	0.072 **	0.075737	0.063	-0.090012	0.066
Central Luzon	-0.016624	0.067	-0.059087	0.072	0.128746	0.063 *	-0.096677	0.065
Southern Tagalog	-0.013292	0.060	0.041074	0.064	0.133905	0.057 *	-0.058506	0.058
Bicol	-0.070443	0.070	-0.086908	0.075	0.099815	0.066	-0.001787	0.068
Western Visayas	-0.039429	0.064	0.091922	0.068	0.126894	0.060 *	-0.033552	0.062
Central Visayas	0.048470	0.071	-0.042706	0.076	0.229860	0.067 **	0.036155	0.069
Eastern Visayas	-0.084535	0.074	-0.104207	0.078	0.001650	0.069	-0.034326	0.072
Western Mindanao	-0.035820	0.076	-0.157502	0.081	0.117059	0.072	0.019903	0.074
Northern Mindanao	0.033836	0.085	0.015246	0.091	0.126003	0.080	-0.107808	0.083
Southern Mindanao	0.086445	0.076	-0.156393	0.081	0.074590	0.071	0.022166	0.074
Central Mindanao	-0.023483	0.075	-0.145287	0.079	0.015978	0.070	-0.125624	0.072
Cordillera Administrative Region	-0.099793	0.077	0.006150	0.082	0.006032	0.073	-0.087356	0.075
Autonomous Region of Muslim Mindanao	-0.025939	0.071	-0.022796	0.076	0.115659	0.067	-0.065122	0.069
Caraga	-0.065243	0.085	-0.055653	0.090	0.111436	0.080	-0.030986	0.082
Ilocos x Urban	-0.121070	0.082	-0.066353	0.087	-0.031313	0.077	-0.073946	0.079
Cagayan Valley x Urban	0.235982	0.091 **	0.137513	0.097	-0.026523	0.085	0.073776	0.088
Central Luzon x Urban	0.017879	0.068	0.058154	0.072	-0.055488	0.064	0.060236	0.066
Southern Tagalog x Urban	0.032920	0.059	-0.010354	0.062	0.010001	0.055	-0.027198	0.057
Bicol x Urban	0.037486	0.083	0.178234	0.089 *	0.076034	0.078	-0.000345	0.081
Western Visayas x Urban	0.055962	0.070	-0.050365	0.075	-0.086470	0.066	-0.144641	0.068 *
Central Visayas x Urban	-0.040695	0.077	0.008209	0.082	-0.052988	0.073	-0.027153	0.075
Eastern Visayas x Urban	0.079005	0.086	0.111311	0.092	0.081604	0.081	0.110029	0.084
Western Mindanao x Urban	0.085032	0.097	0.297345	0.103 **	-0.011688	0.091	-0.139900	0.094
Northern Mindanao x Urban	-0.093310	0.096	0.138919	0.103	-0.063041	0.091	0.164667	0.094
Southern Mindanao x Urban	-0.104293	0.084	0.169189	0.090	0.028562	0.079	-0.004106	0.082
Central Mindanao x Urban	0.098896	0.101	0.245513	0.108 *	-0.036399	0.095	-0.082143	0.098
Cordillera Administrative Region x Urban	0.093460	0.098	-0.001825	0.104	0.079658	0.092	0.191122	0.095 *
Autonomous Region of Muslim Mindanao x Urban	-0.090720	0.112	-0.082933	0.119	0.024686	0.105	0.047193	0.109
Caraga x Urban	0.009990	0.097	0.108913	0.104	-0.045349	0.092	0.003378	0.095
Number of children 6 years and younger	-0.013918	0.010	-0.007120	0.011	-0.003758	0.009	0.008536	0.010
Number of children between 7 and 14 years old	-0.002425	0.009	0.008768	0.009	0.008407	0.008	0.003501	0.008
Number of elderly household members	-0.052800	0.030	-0.002350	0.032	0.045058	0.028	-0.030459	0.029
Number of adult females (other than household head, if female)	-0.068146	0.013 **	-0.092656	0.013 **	-0.022466	0.012	-0.043619	0.012 **
Number of adult males (other than household head, if male)	0.041174	0.014 **	0.016907	0.015	-0.006424	0.014	0.008862	0.014

Variables	First Quarter		Second Quarter		Third Quarter		Fourth Quarter	
	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors	Coefficient Estimates	Standard Errors
A household member is affiliated with								
Agriculture, fishery, and forestry	-0.257498	0.0284 **	-0.130464	0.030 **	-0.032076	0.027	-0.043203	0.028
Mining and quarrying	-0.126342	0.112	-0.085679	0.119	0.042135	0.105	-0.041100	0.109
Manufacturing	-0.251286	0.033 **	-0.065291	0.035	-0.062071	0.031 *	-0.086817	0.032 **
Electricity, gas, and water	-0.086001	0.103	-0.067847	0.109	-0.090854	0.097	-0.012507	0.100
Construction	-0.153328	0.038 **	-0.045713	0.041	-0.047038	0.036	-0.034704	0.037
Wholesale and retail trade	-0.311300	0.026 **	-0.112088	0.028 **	-0.059406	0.025 *	-0.052728	0.025 *
Transportation, storage, and communication	-0.165259	0.034 **	-0.052044	0.036	-0.026197	0.032	-0.006437	0.033
Financing, insurance, real estate, and business services	-0.237167	0.054 **	-0.161564	0.058 **	-0.030826	0.051	-0.078936	0.053
Community, social, and personal services	-0.299945	0.029 **	-0.134127	0.031 **	-0.079404	0.028 **	-0.042313	0.028
A household member is a wage earner	-0.010287	0.027	-0.038670	0.028	0.015148	0.025	-0.007873	0.026
Average years of schooling of male household members	0.000764	0.003	-0.002768	0.003	0.001462	0.003	0.004493	0.003
Average years of schooling of female household members	0.007237	0.004 *	0.009432	0.004 *	0.006792	0.003 *	0.002912	0.004
House has sanitary water and water-sealed toilet facilities	0.031467	0.029	-0.005776	0.030	0.008679	0.027	-0.016720	0.028
House is predominantly made of strong materials	0.061873	0.023 **	0.000949	0.025	-0.012614	0.022	0.007358	0.023
Household has a car	0.036314	0.039	0.009057	0.041	-0.006569	0.037	0.003170	0.038
Nonlabor income (in thousands)	-0.000093	0.000	-0.000075	0.000	-0.000051	0.000	0.000178	0.000
Male headed household	0.105472	0.064	0.140031	0.069 *	0.029013	0.061	0.085863	0.063
Age of household head	0.014241	0.006 *	0.012911	0.006 *	0.005558	0.005	0.005588	0.005
Square of age of household head	-0.000152	0.000 **	-0.000133	0.000 *	-0.000069	0.000	-0.000056	0.000
Years of schooling of household head	0.001286	0.007	0.006782	0.008	-0.000238	0.007	0.001215	0.007
Male headed household x Years of schooling of household head	-0.001858	0.007	-0.008403	0.008	-0.004523	0.007	0.000286	0.007
Constant	-0.068372	0.149	-0.205345	0.159	-0.160495	0.141	-0.134581	0.145
R^2	0.0889		0.0455		0.0163		0.0202	
Adjusted R^2	0.0772		0.0332		0.0037		0.0076	
Number of Observations	4413		4413		4413		4413	

Notes:

1. The coefficient estimates reported in this table are the differences of the coefficient estimates between quarters+A33 t and t - 4, which were directly estimated by OLS.
2. The standard errors of the coefficient estimates are directly estimated from the OLS regressions.

* - significant at .05 level.

As expected, because the economy swung from a period of expansion to a period of contraction between 1997 and 1998, the number of adult male members, which presumably would have been positively correlated with male employment during the upswing and negatively correlated with it during the downswing, made households more vulnerable to employment shocks in the first, second, and fourth quarters. More puzzling was the switch in sign of the coefficient of the number of adult female members, from having an unexpected negative impact on the change in male employment in the second quarter to exerting a positive impact in the fourth quarter, which is more in line with the hypothesis.

Turning to the industry affiliation variables, note that only the utilities sector (i.e., electricity, gas, and water) did not have statistically significant and negative coefficient estimates in the first quarter, in effect indicating that the initial employment shock was quite pervasive. Fortunately, in general, the effects did not linger. In the second quarter, only three industries showed negative and significant coefficient estimates; in the third quarter, only two; and in the fourth quarter, only one. As may be expected, the industries which were associated with persistent vulnerability to employment shocks (i.e., shocks of two or three quarters) included the agriculture sector, perhaps because of the prolonged effects of the *El Niño* phenomenon, the wholesale and retail trade sector, perhaps because of the rationing of bank credit, the transport, storage and communication sector, possibly because of the dwindling of business transactions resulting from the economic downturn, and the financing, insurance, real estate, and business services sector, because of the bursting of asset bubbles in the stock and real estate markets.

As mentioned earlier, the presence of a wage earner among its working-age members made a household more susceptible to employment shocks in all four quarters. This may be because, compared to self-employed workers or workers in family-owned enterprises, wage earners have less control over their employment status.

The average number of years of schooling of male (but not female) working-age members of the household conferred an insulating influence from employment shock, as expected, but only in the first quarter. These results are difficult to interpret, however, because of the confounding effect of reservation wages, as discussed in the previous subsection.

As for the asset variables, the results show that households with sanitary facilities were vulnerable to an employment shock in the second quarter and that those with large non-labor incomes were similarly at risk in the first quarter. In line with the hypothesis, these results are consistent with the findings of Alba [2000], Balisacan [1999], and Datt and Hoogeveen [2000] that the better off households were less affected by the *El Niño* droughts and rising prices, but were more vulnerable to labor-related shocks, such as wage cuts and job losses.

Among the variables related to the household's social standing or the extensiveness of its information network, only the coefficients for the first and second quarters of the age of the household head and its square turned out to be statistically different from zero. As expected, the household head's age had concave effects on the employment (in)vulnerability of male members of the household, with maximal

insulating impacts at ages 43.6 and 48.0 years for the first and second quarters, respectively.

Addressing the same question in the case of female employment, Table 8b indicates that, as in the case of male employment, different factors explain employment-shock vulnerability in different quarters. Moreover, the results are somewhat different compared to those for the men.

Among the geographic location variables, relatively more areas had effects that were found to be statistically different from that of NCR. These included the urban and rural areas of Cagayan Valley in the first quarter, Cagayan Valley and the urban areas of Bicol and Western and Central Mindanao in the second quarter, Central Luzon, Southern Tagalog, and Western and Central Visayas in the third quarter, and the urban areas of Western Visayas and the Cordillera Administrative Region (CAR) in the fourth quarter. Moreover, in contrast to the results for men, most of the areas with statistically significant coefficient estimates had positive signs, the only exceptions being Cagayan Valley in the first and second quarters, and urban areas of CAR in the fourth quarter. Hence, it may be said that, in the case of female employment, households located in some regions were less vulnerable compared to those residing in NCR.

As expected, the number of adult female members made households more vulnerable to employment shocks in the first, second, and fourth quarters. And the number of adult male members exerted a positive impact in the first quarter.

In the case of the industry affiliation variables, only mining and quarrying and electricity, gas, and water did not have statistically significant and negative coefficient estimates in the first quarter, in effect mimicking the results for men. But just as in the men's case, the effects of the employment shock, although initially pervasive, did not persist. In the second quarter, only four industries showed negative and significant coefficient estimate; in the third, only three; and in the fourth, only two exhibited this characteristic. As may have been expected, the industries that were associated with persistent vulnerability to employment shocks (i.e., shocks of two or three quarters) were those sectors that employed relatively more women (as shown in Alba [1997]). These included manufacturing, wholesale and retail trade, and community, social, and personal services.

Not surprisingly, the average number of years of schooling of female (but not male) working-age members of the household conferred an insulating influence from employment shock in the first three quarters.

As for the asset variables, the results show that households who resided in houses made of predominantly strong materials were less vulnerable to an employment shock in the first quarter.

Finally, among the variables related to the household's social standing or the extensiveness of its information network, only the coefficients of the sex of the household head in the second quarter and of household head's age (and its square) in the first and second quarters turned out to be statistically different from zero. Male household head had a positive effect on the four-quarter change in the

employment level of female members because, as found in Table 6b, male headship has a negative effect on employment level. Just as in the case of men, the household head's age had concave effects on the employment (in)vulnerability of female members of the household, with maximal insulating impacts at ages 46.9 and 48.6 years for the first and second quarters, respectively.

7. Concluding remarks

This paper investigated the vulnerability of Filipino households to employment shocks that were brought on by the Asian financial crisis and the *El Niño* dry spells of 1997 and 1998. Using a panel data set of households culled from eight consecutive quarters of the LFS and the 1997 FIES, it explored the correlates of employment-shock vulnerability from among a select set of household characteristics, such as location of residence, household size and age and sex composition, industry affiliation and educational attainments of household members, and indicators of household wealth. Estimating the parameters of a reduced form equation, it found that the factors affecting vulnerability were different in different quarters and between male and female workers. For male employment, among the more robust explanatory variables were the number of school-aged children in the household (which conferred an unexpected insulating influence), affiliation with the wholesale and retail trade and the financing, insurance, real estate, and business services sectors, and having wage-earners among household members. For female employment, the variables with consistently significant coefficients turned out to be the number adult female household members, affiliation with the manufacturing, wholesale and retail trade, and community, social, and personal services sectors, and the average number of years of schooling of adult female members (which made households more invulnerable to employment shocks).

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