

# Individual, household and family responses to terrorism: Evidence from longitudinal household survey data

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## Introduction

Attacks on the World Trade Center and the Pentagon in September 2001 heralded a new era of high profile assaults by extremist organizations. The bombing of tourist resorts in Bali and Mombasa marked the beginning of a terrorist campaign aimed at soft targets -- a campaign that has escalated and is reaching all corners of the world. There is very little known about how these attacks have affected families and households in the vicinity of the attack and how those families have coped with the social and economic consequences of the attack.

This paper uses unique data that were specially collected to measure the impact on individuals, households and families of the October 2002 bombing of Kuta Beach in Bali, Indonesia. Recognizing that well-being is multi-dimensional, we examine the impact of the bombing on several domains of economic and social being, physical and psycho-social health. Special emphasis is placed on the ways in which the family has served to mitigate the deleterious impact of the attacks on individuals and households.

Bali is particularly well-suited to measuring these effects. International tourism is the mainstay of the economy. Tourism accounts for over 40% of formal employment and the vast majority of informal workers are either directly or indirectly engaged in providing goods and services for tourists. Tourism collapsed after the October 2002 bombing. In September, 2002, hotel occupancy rates were around 70% and direct international tourist arrivals that month were 150,000. By November, 2002 hotel occupancy rates were less than 10% and arrivals had plummeted to 31,000. This staggering decline in tourists understates the impact on the Balinese economy as the composition of visitors has shifted towards domestic tourists, who spend far less than the Japanese, Australians, Europeans and Americans.

The economic implications of the decline in tourism extend beyond the direct effect of fewer jobs in hotels, restaurants and other service industries. Declines in demand for food and handicrafts have affected those employed in the agricultural and manufacturing sectors. Lower incomes among workers in tourist-related activities has had a domino effect on demand for all goods and services throughout the economy. The downturn in the economy after the bombing is likely to exacerbate whatever negative consequences of the bombing has had for social, health, and psychological well-being. Whereas numerous anecdotal accounts document the economic woes of woodcarvers and waitresses, there is no systematic evidence regarding the effects of the terrorist bombing. This paper provides that evidence. The paper also provides new evidence on the strategies that individuals, households and families adopt to cope with large, unanticipated shocks to the society.

## Data and Methods

The research reported in this paper is based on data from two rounds of a longitudinal survey of households. The first round of the survey was conducted in February, 2002, by the Indonesian Government as part of the annual National Social and Economic Survey (SUSENAS). Over 7,000 individuals living in almost 2,000 households are included in the sample and they are representative of the population on the island of Bali. The Government gave us permission to re-interview those people and so, in early 2003, a few months after the bombing, we re-interviewed 92% of the SUSENAS respondents.

By contrasting the economic, social and health status of households before and after the bombing, we will measure the immediate effects of the bombing. Moreover, we will identify some of the coping strategies adopted by individuals, households and families in response to the shock. These descriptive results are an important contribution to the scientific literature. Third, since the bombing came as a complete shock, it is reasonable to treat the change in earnings that occurred between the two surveys as primarily driven by exogenous factors. Under this assumption, interacting the income shock with characteristics of individuals and their families provides new evidence on the role of the family in mitigating the deleterious impact of the terrorist bombing.

While we will focus on the immediate effects of the bombing, a second follow-up survey will be conducted in February, 2004. It will provide insights into the medium term consequences of the bombing and also how coping strategies we identify have mitigated the consequences of the bombing.

Interpretation of the evidence will be complemented with results from in-depth interviews conducted in October 2003 with a sample of respondents who were not included in our longitudinal survey.

## Results

The paper begins with a description of the immediate consequences of the bombing on economic well-being. In addition to describing the effect on the employment and earnings of individuals, we examine the role that households play in absorbing the shock associated with the bombing. This is further explored by examining changes in household spending patterns -- and the composition of that spending -- as well as changes in family living arrangements. Both mechanisms are important ways in which households and families have coped with the bombing. We next turn to measuring the effects of the bombing on the physical and psycho-social health of individuals and assess the extent to which individual, household and family characteristics mitigate the deleterious impact of the bombing.

Anecdotal evidence from Bali is replete with descriptions of a collapse in employment opportunities as tourists fled the island. The fact do not support those anecdotes. Our survey data demonstrate unemployment did not substantially increase after the bombing. In fact, as shown in Table 1, declines in employment for prime age men are small, and there is a compensating increase in employment of prime age women. Employment of older men and women declined (in part because of age). A remarkably similar pattern was observed after the collapse of the Indonesian rupiah in early 1998.

The second panel of Table 1 reports real hourly earnings in 2002 and in 2003 for all respondents who were working in the wage sector at the time of the survey. Whereas the drama of the bombing is not reflected in unemployment, it is clearly reflected in the collapse of earnings: real hourly earnings in the wage sector fell around 20% for males and 18% for females. These are huge shocks to the earning capacity and, therefore, economic security of individuals.

*Table 1: Employment and earnings of individuals*

		Males		Females	
		2002	2003	2002	2003
Employment	25-55 year olds	93.0	91.5	69.1	72.9
	56-75 year olds	75.1	69.3	50.6	47.3
Hourly wage (last month)		4.7	3.9	3.4	2.9

(Rp 000) (0.2) (0.1) (0.2) (0.2)

Notes: Standard errors in parentheses. Income measured in February 2002 rupiah. US\$1=Rp8,000.

*Table 2: Household earnings and expenditure*

(Rp 000)	2002	2003	Change	(std.err.)
1. Earnings from wage work	588	479	-110	(18)
2. Earnings from self-employment	582	432	-150	(46)
3. Total household earnings	1170	911	-259	(48)
4. Total household expenditure	1287	1122	-165	(52)
5. Household size	4.02	4.13	0.10	(0.02)
6. <i>Per capita</i> household expenditure	340	304	-36	(12)
7. <i>Per capita</i> expenditure on				
7a. food prepared at home	113.6	116.0	2.4	(1.7)
7b. food prepared away from home	34.9	15.2	-19.6	(1.1)
7c. housing, energy	68.1	81.4	13.3	(2.2)
7d. education	7.8	12.5	4.7	(1.5)
7e. health	12.6	25.8	13.2	(3.2)
7f. clothing, personal care	36.7	18.6	-18.1	(1.1)
7g. semi-durables, festivals	49.9	35.8	-14.2	(7.1)

All values in February 2002 rupiah.

The literature suggests that the family is likely to be an important institution for sharing both resources and risks. Many households, for example, diversify risk by having some members work in the formal wage sector and others in the self-employed or informal sector. If shocks affect these sectors differently, the household can insure its members against unanticipated income shocks. This suggests that household earnings should decline less than individual earnings. As shown in the first row in Table 2, that did not occur. Total household earnings declined by over 20% in one year -- with the decline in income from self-employment being even larger than that from wage work. With a shock that is both large and widespread, the household is clearly unable to provide insurance and protect its members from the negative impacts of reduced incomes.

There are, however, other mechanisms that households and families might adopt to mitigate the economic effects of the negative income shock. We explore three such mechanisms in detail. First, household earnings do not provide a complete picture of household economic security since, in times of trouble, households may draw down savings. The fourth row of Table 2 reports changes in household expenditure. It declined by around 14%. While this is a very large decline, it is substantially and significantly less than the fall in household income.

As research on the 1998 financial crisis in Indonesia has shown, drawing down wealth savings is not the only way Indonesian families have maintained consumption levels in the face of a major shock. Family members may adjust living arrangements to exploit economies of scale in shared housing. We would expect household size to increase as a result of the bombing. As shown in row 5, household size increased on average by 0.1 members. This is a large increase in one year and is against the secular trend of smaller household sizes. Young women (<15) and older women (>55) tended to join the sample households while young adults (15-24) tended to leave. Since household size increased, the reduction in household expenditure understates the decline in well-being of household members. While adjustments for household composition are controversial and will be explored in depth in the paper, as a first step, we report *per capita* household expenditure (PCE) in the sixth row of the table. PCE declined by 11% on average which is half the decline in household income. Moreover, the rise in household size is larger among households that had larger declines in expenditure which is why mean PCE fell less than mean total expenditure.

This clearly demonstrates the key role that families play in sharing the burden of unanticipated income shocks: family members have joined together to form larger households and exploit the

economies of scale associated with housing and energy as well as in food preparation. Apparently, these benefits outweigh the costs of reduced privacy. In this research, we will explore in more detail the changes in living arrangements associated with the bombing and relate those to the demographic and socio-economic characteristics of household members.

The allocation of household spending among goods will also likely respond to income shocks. Spending on some goods (such as food) may be difficult to substitute over time while others such as clothing or furniture might be postponed with little immediate effect on welfare. The allocation of spending is reported in the remaining rows of Table 2. Whereas *per capita* expenditure on food prepared at home did not change, food prepared away from home fell by over 50%: households presumably substituted out of more expensive prepared foods and put more time in food preparation in an effort to save money. Spending on housing and energy, education and health all rose substantially. (Part of the rise in energy spending reflects higher prices.) However, there were substantial reductions in spending on clothing and personal care, semi-durables and festivals -- all commodity groups for which postponement of spending makes good sense.

Having established the economic consequences of the bombing, we turn to an examination of effects on other domains of the lives of the Balinese population. These include the effect on investments in health, health status of adults and children, and the ways in which the bombing affected the more general sense of well-being of the population. The impact of the bombing on health will be examined by comparing use of health care and incidence of a set of specific morbidities as reported in 2002 with responses to the same questions by the same people a year later in 2003.

As noted above, there was a significant increase in spending on health and this is reflected in an increase in use of health care services by both adults and children. For example, there was an almost 50% increase in the fraction of children under 15 who used health care in the 4 weeks prior to the survey in 2002 than in 2003 and a roughly similar increase among prime age adults. Corroborating evidence is provided by an increase in the incidence of limitations to daily living (also by around 50%) and in several specific morbidities. For example, about 5% of adults reported suffering from a headache during the 4 weeks prior to the 2002 interview. This rose four-fold to 20% in 2003. It is very likely that this reflects a worsening of psycho-social health status.

While the 2002 SUSENAS did not contain questions about psycho-social well-being, questions on mental health were included in the 2003 interview. Over two-thirds of adult respondents reported feeling upset when something reminded them of the Kuta bombing and 10% reported having recurring memories of the bombing. Moreover, about 7% of female adults and 13% of male adults report their emotional well-being was worse at the time of the interview relative to prior to the Bali bombing.

The final set of analyses in this paper will relate changes in the outcomes described above to the characteristics of individuals, households, families and communities in order to identify those types of households and families that have been best able to mitigate the deleterious impact of the Bali bombing on well-being. Since we construe well-being very broadly and because the bombing likely had wide-ranging impacts of different sub-groups of the population, we exploit the richness of our longitudinal survey data and examine changes in household size and demographic composition, household spending patterns, use of health care, physical and psycho-social health status.

Since the Bali bombing was completely unanticipated, the change in hourly earnings between 2002 and 2003 can be plausibly treated as an income shock. After controlling individual and family characteristics, the interaction between the size of the household income shock and characteristics of individuals and their families provides a direct test of the role that households and families play in mitigating the impact of the bombing on the lives of the Balinese. Over and above socio-demographic characteristics of individuals such as age, gender and education, we will pay special attention to the role played by household composition, living arrangements and relationships prior to the bombing. This will provide insights into whether specific demographic groups receive special protection (such as prime age adults or income earners, children of the household head, grand-parents or grand-children). By examining changes in household structure in response to the bombing, we will highlight the special role of non co-resident family members in this process.