CONVERGENCE : THE JOURNAL OF ECONOMIC DEVELOPMENT
Vol.7, No.1, pp.1-19, June 2025.

e-ISSN 2721-625X
ISSN 2721-6330

MEASURING THE IMPACT OF THE BALI BOMBING AS AN ECONOMIC SHOCK: A Difference-in-Differences Method Approach with Interaction Variable

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ABSTRACT

This study investigates the economic consequences of terrorism by examining the impact of the Bali Bombings I (2002) and II (2005) on individual income in Indonesia. Using microdata from the Indonesia Family Life Survey (IFLS) for the periods 2000 and 2006, the analysis applies the Difference-in-Differences (DiD) method to identify causal effects of the bombings on income outcomes. The empirical strategy distinguishes between pre- and post-bombing periods, affected and unaffected regions, and further introduces interaction variables capturing direct impacts on individuals experiencing material and psychological losses. Additional socio-economic controls, such as education, gender, age, employment status, household role, urban–rural residence, ethnicity, and welfare status, are incorporated to reduce estimation bias. The results show that the Bali Bombings significantly reduced average income in affected areas by approximately 26.44 percent compared to unaffected regions. Individuals directly exposed to the bombings experienced even larger losses, with their income declining by about 36.33 percent. Distributional analysis further indicates that the middle-income group (40 percent of the population) was most severely affected, while low- and high-income groups showed relatively minor impacts. These findings highlight the vulnerability of the middle class, which plays a critical role in sustaining Indonesia's economic development. This study contributes to the literature on terrorism and economic development by providing micro-level evidence of how external shocks disrupt household welfare and income distribution. The findings have important policy implications, particularly for designing social protection programs and resilience strategies in tourism-dependent regions facing risks of conflict and disaster.

Keywords : *Difference-in-Differences, Individual Income, Bali Bombings, Direct Impact, Education and Age, Household Welfare, Terrorism and Economy.*

ABSTRAK

Penelitian ini mengkaji dampak ekonomi dari peristiwa terorisme dengan meneliti pengaruh Bom Bali I (2002) dan Bom Bali II (2005) terhadap pendapatan individu di Indonesia. Data yang digunakan berasal dari Indonesia Family Life Survey (IFLS) periode 2000 dan 2006. Metode yang digunakan adalah Difference-in-Differences (DiD) untuk mengidentifikasi pengaruh kausal dari peristiwa bom terhadap pendapatan. Strategi empiris membedakan antara periode sebelum dan sesudah bom, wilayah terdampak dan tidak terdampak, serta menambahkan variabel interaksi untuk menangkap dampak langsung pada individu yang mengalami kerugian material maupun psikologis. Variabel kontrol sosio-ekonomi juga dimasukkan, seperti pendidikan, gender, usia, status pekerjaan, peran dalam rumah tangga, lokasi perkotaan/pedesaan, etnisitas, dan status kesejahteraan. Hasil penelitian menunjukkan bahwa Bom Bali secara signifikan menurunkan rata-rata pendapatan di daerah terdampak

e-ISSN 2721-625X
ISSN 2721-6330

sekitar 26,44 persen dibandingkan daerah yang tidak terdampak. Individu yang terkena dampak langsung mengalami kerugian lebih besar, dengan penurunan pendapatan sekitar 36,33 persen. Analisis distribusi pendapatan menunjukkan bahwa kelompok berpendapatan menengah (40 persen dari populasi) adalah yang paling terdampak, sementara kelompok rendah dan tinggi relatif tidak terlalu terkena dampaknya. Temuan ini menyoroti kerentanan kelas menengah, yang justru memiliki peran penting dalam mendorong pembangunan ekonomi Indonesia. Penelitian ini memberikan kontribusi pada literatur tentang terorisme dan pembangunan ekonomi dengan bukti mikro mengenai bagaimana guncangan eksternal mengganggu kesejahteraan rumah tangga dan distribusi pendapatan. Temuan ini juga penting bagi perumusan kebijakan, terutama untuk merancang program perlindungan sosial dan strategi ketahanan di wilayah yang bergantung pada pariwisata serta berisiko terhadap konflik maupun bencana.

Kata kunci: *Difference-in-Differences, Pendapatan Individu, Bom Bali, Dampak Langsung, Pendidikan dan Usia, Kesejahteraan Rumah Tangga, Terorisme dan Ekonomi.*

INTRODUCTION

The significant tourism potential in Bali has driven the development of a better economy. The shift in the economic sector from agricultural activities and small industries to tourism-related services and its supporting sectors is a clear proof of the substantial impact that tourist visits to Bali have had. Since the 1990s, people from outside Bali, such as Lombok, Bima, Banyuwangi, and even Kupang, have sought livelihoods in Bali. Nearly all sectors of the economy have developed rapidly due to tourism activities. Bali has transformed into a region that is frequently visited by tourists, particularly international visitors. Entering the reform era, information and communication networks became increasingly sophisticated. Various opportunities, challenges, and threats are inseparable from Indonesia's economic development, especially in Bali. The bomb tragedy that occurred on Bali Island 20 years ago delivered a tremendous shock to the tourism sector. This shock did not only affect a single location and time but also caused significant ongoing effects. In addition to approximately 200 fatalities, thousands of people also lost their main livelihoods. From an external perspective, the psychological effect on tourists visiting Bali drastically declined (UNDP, 2005). Tourists were reluctant to visit as long as safety was uncertain. Moreover, this event left a deep trauma for the Balinese and surrounding communities. The significant impact of the terrorist tragedy on the tourism sector, both internally and externally, makes it an interesting topic to analyze in relation to the differences in individual income levels in Bali and its surrounding areas as a result of the Bali Bombing. Several studies have shown that external shocks, such as terrorism,

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ISSN 2721-6330

have a substantial effect on the economy and tourism. There are significant long-term economic consequences, including the reallocation of businesses, a decline in tax revenues, falling property values, reduced tourism, and the impact on retail, hotel, and industry businesses (The Century Foundation, 2002). The Bali bombing incident caused the tourism sector to collapse, and communities depending on this sector were socio-economically affected (Gurtner, 2004).

Studying the socio-economic shock caused by shocks is crucial for several reasons, including (1) Assessing the economic impact: socio-economic shocks, such as financial crises, pandemics, or drastic changes in economic policies, can disrupt certain economic sectors, such as industry, labor, and trade. Studying their impact allows us to understand how imbalances in these sectors affect overall economic growth. (2) Identifying affected groups: every type of socio-economic shock can impact different societal groups. For example, the COVID-19 pandemic greatly affected informal workers and the tourism sector, while the global financial crisis may have had a greater impact on capital markets and investors. By examining these impacts, policies can be designed to protect vulnerable groups. (3) Policy planning and response: by understanding the types of shocks and their effects, governments and related institutions can design more effective response policies, such as fiscal stimulus, healthcare system updates, or more targeted social assistance. (4) Enhancing economic resilience: studying socio-economic shocks helps in designing long-term strategies to strengthen economic resilience. Countries and communities that understand the risks and potential impacts of shocks can better prepare for similar crises in the future. (5) Accelerating recovery: studying the impacts of socio-economic shocks allows for accelerating post-shock recovery.

The first objective of this study is to examine the income differences between individuals in the Bali bombing-affected area and its surrounding regions. The study by UNDP in 2005 found that 94 percent of the population in all districts of Bali experienced a decline in income between October 2002 and March 2003, with an average reduction of about 43 percent. Second, comparing income differences due to the Bali bombing's impact based on income levels. Third, analyzing several variables that are supposed to have a significant impact on determining the differences in individual income affected by the Bali Bombing. The hypotheses of this study are (1) the Bali Bombing affected individual income levels in

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Bali Province and West Nusa Tenggara. (2) Individuals directly impacted by the Bali Bombing experienced (live in Bali and West Nusa Tenggara and directly affected by the disaster or social conflict) a more significant influence than other individuals in the affected areas (live in Bali and West Nusa Tenggara but not have directly affected by the disaster or social conflict). (3) Individuals in the middle-income group were most affected in terms of their income level.

LITERATURE REVIEW

Choi, J. H., & Lee, S. M. (2021) state that bomb attacks have a highly destructive socio-economic impact, and economic recovery can be achieved with appropriate strategies, including adaptive economic policies, rapid infrastructure improvements, and the reduction of market uncertainty. Additionally, strengthening sectors most vulnerable to terrorism and building long-term economic resilience are crucial to mitigating the long-term effects of terrorist attacks. Similarly, Caruso, R., & Sandler, T. (2020) found that the economic costs of terrorism are vast and have various dimensions, including direct, indirect, and long-term costs. Terrorism disrupts many aspects of the economy, such as investment, trade, and consumption, while also adding social burdens through the destruction of social and psychological capital. However, with responsive economic policies and effective recovery strategies, countries can reduce the long-term impact of terrorism and accelerate economic recovery.

Gurski, R. (2022), in his book, states that bomb attacks carried out by terrorist groups have evolved with technological advancements, with widespread direct and indirect impacts on global security, the economy, and social stability. 21st-century terrorism requires a more adaptive and integrated approach in terms of policy and strategies to mitigate its impact. New technologies, both in terms of attacks and responses to threats, play an increasingly important role in the dynamics of modern terrorism. Blomberg, S. B., & Hess, G. D. (2022) outline that bomb attacks, as a form of terrorism, have a highly detrimental effect on both short-term and long-term economic growth. The uncertainty caused by the attacks, as well as direct damage to infrastructure and key economic sectors, exacerbates the economic situation in affected countries. Economic recovery requires the right policies to reduce uncertainty, rebuild infrastructure, and encourage investment and consumption.

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Lustgarten, A. (2022), in his research, reveals that the costs of terrorism far exceed the physical damage and direct economic impact. One of the greatest impacts of bomb attacks is the destruction of social capital, which worsens distrust and social cohesion within communities. This impact hinders long-term economic and social recovery, reducing the capacity for collaboration and cooperation at the community level. Therefore, policies that focus on restoring social capital and improving social relations are crucial to mitigating the long-term impacts of terrorism and ensuring the sustainability of economic and social development. Niazi, A., & Siddiqui, R. (2022) state that terrorism significantly damages economic stability in the South Asian region. The damage to infrastructure, vital economic sectors, and social capital worsens economic uncertainty and slows down economic growth. Countries in this region face major challenges in balancing the need to maintain security with efforts to achieve economic development. Effective policies and regional collaboration are crucial to reducing the long-term impact of terrorism and promoting more stable and sustainable economic recovery.

Khosravi, M., & Farzanegan, M. R. (2022) examined that terrorism has had a highly detrimental impact on economic growth. Its short-term and long-term effects include a decrease in investment, losses in key sectors such as tourism and infrastructure, and increased security expenditures that reduce the country's ability to develop other economic sectors. Choi, J. H., & Lee, S. M. (2022) stated that bomb attacks and terrorism have had far-reaching impacts both in the short and long term, in both social and economic terms. The social impact includes psychological trauma and social damage, while the economic impact includes infrastructure losses, a decline in business activities, and the diversion of resources needed for development. Recovery from the effects of terrorism requires significant attention to both social and economic needs, as well as support from various parties at both the national and international levels.

Friedman, J. (2020) in his book states that countries frequently targeted by terrorism often experience a sharp decline in the tourism and trade sectors, which can be significant sources of income for the economy. Terrorist attacks can also cause psychological trauma, particularly among communities directly affected. Widespread fear may lead to social tensions and increased mental health issues among the population. Furthermore, in the global context, terrorist attacks can disrupt international supply chains, cause price surges

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for certain goods, and create economic tensions between major countries. Miller, R. (2020) argues that the social and economic costs of bomb attacks are significant, affecting individuals, local communities, and micro-economies. Terrorism disrupts social life, causes deep psychological trauma, and harms local economic activities and vulnerable micro-businesses. Recovery from such attacks requires serious attention from governments, financial institutions, and the international community to expedite the recovery process and minimize long-term impacts.

Sulistyaningrum (2017) explains that the exam scores of children in earthquake-affected areas tend to be lower than those of children outside the earthquake areas. A deeper analysis shows that children directly impacted by the earthquake have lower scores compared to those who were not directly affected, even if they are within the earthquake area. From this, it can be said that a natural disaster or external shock affects outcomes in a gradually spatial manner. The closer to the disaster epicenter, the greater the impact felt. A study on the relationship between the economy, tourism, and terrorism was conducted by Meindl (2018) regarding the effects of terrorism on the economy in Paris and Brussels. The terrorist attacks in Paris reduced the appeal of tourism, as evidenced by a 10 percent drop in hotel room occupancy rates. The fear experienced by tourists increased proportionally as bombings occurred in other areas. On average, the recovery period after a terrorist tragedy takes at least 13 months.

RESEARCH METHODOLOGY

This study uses the Difference in Differences (DiD) method, which fitted the impact of a shock or policy on an affected group. Such shocks or impacts can include changes in government policy, natural disasters, social conflicts, and others. DiD can compare the change outcomes over time between observation units in affected groups and those in unaffected groups (Gertler et al., 2016). This DiD method can separate the impact of a shock into differences over time and differences between groups. In this context, the time difference refers to the state of the group before and after the shock occurred, while the group difference refers to the condition distinguishing the group affected by the shock from the group that is not. To obtain the best estimate from this method, an interaction variable between the two differences is used. Impact analysis is carried out only through

e-ISSN 2721-625X
ISSN 2721-6330

this interaction variable. In addition, several explanatory variables are used in the constructed DiD model.

In this study, individual income is defined as the total income received by an individual over the course of one year, regardless of whether they worked for an hour continuously the previous week. There are three key variables in constructing the DiD model: (1) the pre-post variable, which distinguishes the state before and after the Bali Bombing I and II, in this case, the years 2000 and 2006; (2) the with-without variable, which distinguishes the areas affected by Bali Bombing I and II from those unaffected, where the affected areas are Bali Province and West Nusa Tenggara, while the unaffected areas are DI Yogyakarta and Banten Provinces. These two provinces were selected considering that the potential for tourist visits is not significantly different, and the region's size and accessibility are not as extensive as other provinces on Java Island; and (3) the interaction variable, which is a combination of the two previous key variables representing the differences between these two key variables (Double Difference).

In DiD analysis, the parallel trend assumption must be met for the dependent variables used. This assumption can be visualized by the data series plots between before and after the shock in the affected and unaffected areas that tend not to intersect and have slopes that are not significantly different. The endogeneity problem must be resolved so that the estimation in the model does not provide bias due to the influence of the dependent variable or ommited variables. The Haussman test can be used t o find out this problem. The basic DiD formula of this study can be expressed as:

$$inc_{it} = \beta_0 + \beta_1 bombs_{it} + \beta_2 pasca_{it} + \beta_3 BR_{it} + \nu_{it} \ldots\ldots\ldots\ldots\ldots\ldots [1]$$

where:

inc_{it} – a numeric variable that is truncated at the 5 percent lowest income and 1 percent highest income. This is done to minimize the effects of outliers in the average calculation of DiD components.

$bomb_{it}$ – a dummy variable that representing the with-without DiD component (the difference of region)

$pasca_{it}$ – a dummy variable that representing the pre-post DiD component (the difference of time)

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BR_{it} – (bomb region) a dummy variable that form by multiplying of $bomb_{it}$ and $pasca_{it}$.

v_{it} – represents random error and/or unobserved variables.

In this study, the DiD model is modified by adding an interaction variable for individuals directly affected by disasters or social conflicts, experiencing both mental and material losses. The modified DiD model is formulated as:

$$inc_{it} = \beta_0 + \beta_1 bombs_{it} + \beta_2 pasca_{it} + \beta_3 BR_{it} + \beta_4 DI_{it} + \upsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots [2]$$

Where DI_{it} (Direct Impact) is the result of multiplying the BR interaction variable with a dummy variable for individuals directly affected by the disaster or social conflict.

Furthermore, several explanatory variables are used, such as: (1) ethnicity, where the Balinese and Sasak ethnic groups are suspected to have the greatest opportunity to earn income in the affected areas; (2) years of schooling, calculated based on the last grade completed in the individual's highest level of education; (3) gender; (4) age; (5) activities in the last week, where if an individual has been working or helping the family to earn income, they are likely to have a greater opportunity to earn income; (6) urban/rural status; (7) marital status; (8) relationship to the head of the household, where the head of the household is assumed to have the greatest role in earning income; and (9) welfare status, where welfare is measured using a score for the ownership of valuable goods and household characteristics according to the Wealth Index indicators (Demographic and Health Survey USAID), but with some indicators removed, classifying it into two categories in this study. Of these nine explanatory variables, all are dummy variables, except for years of schooling and age. It can be generally formulated as:

$$inc_{it} = \beta_0 + \beta_1 bombs_{it} + \beta_2 pasca_{it} + \beta_3 BR_{it} + \beta_4 DI_{it} + \Gamma_k X_{kit} + \upsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots [3]$$

Where Xk is the vector of explanatory variable covariates described previously, with k = 1, 2, ..., 9.

External shocks can affect all layers of society at every level of welfare, in this case, income. However, the effects of these shocks can differ based on an institution's ability to respond to them (Nizar, 2015). This study will also examine the impact of the Bali bombing at different income levels. According to the income distribution concept from the National Socio-Economic Survey (Susenas) BPS, the income percentage divisions used in

e-ISSN 2721-625X
ISSN 2721-6330

this study are 40 percent of the lowest income, 40 percent of middle-income, and 20 percent of the highest income. Equation (4) shows the formulation of the complete model used in this study:

$$Q^{\tau}(inc_{it}) = \beta_0 + \beta_1 bombs_{it}^{\tau} + \beta_2 pasca_{it}^{\tau} + \beta_3 BR_{it}^{\tau} + \beta_4 DI_{it}^{\tau} + \Gamma_k X_{kit}^{\tau} + \upsilon_{it}^{\tau} \quad \ldots\ldots\ldots\ldots\ldots\ldots [4]$$

Where Qτ represents the income distribution group of individuals: 40 percent lowest, 40 percent middle, and 20 percent highest.

RESULTS AND DISCUSSION

No less than 2 million tourists visit Bali Island each year. This has driven the high regional income in Bali (Basra, 2014). Foreign exchange from the tourism sector nationally is about 2.5 billion US dollars per year, with Bali contributing about half of it (Nuvitasari, 2009). On October 12, 2002, a bombing tragedy occurred in the Kuta area, Badung Regency, Bali (Bali Bombing I). This incident resulted in 202 deaths (mostly foreigners) and 240 injuries. Tourism became the most affected sector by this shocking tragedy (Gurtner, 2004). The number of foreign tourists drastically decreased in November 2002, showing a 77.62 percent decline compared to visits in September 2002. As shown in Figure 1, it took until mid-2004 to reach the same number of visits as in September 2002. While Bali's economy had not fully recovered, another bomb was detonated in October 2005.

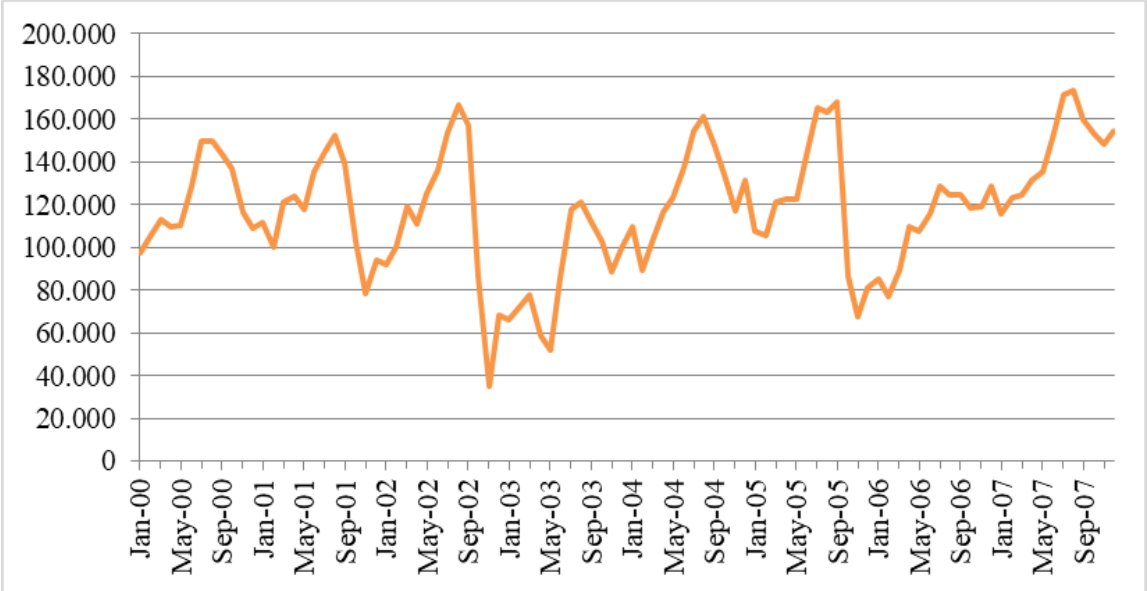

Figure 1. International Tourist Arrivals to Indonesia Through I Gusti Ngurah Rai Bali Airport, 2002 – 2007

Source: Statistics Indonesia, 2001-2007

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According to BPS data, the proportion of the population working in the agricultural sector in 2005 was around 33.56 percent, while in the tourism support sectors (trade, hotels, restaurants; transportation, and communications) it was approximately 25.65 percent. Compared to 2001, the proportion of the population working in agriculture was around 32.19 percent, and in the tourism support sectors, it reached 29.36 percent. Between January and April 2003, around 29 percent of the population lost their jobs due to the impact of the Bali Bombing I. Additionally, approximately 52 percent of small and medium enterprises had to reduce their workforce (Basra, 2014). In addition to Bali, the economic stability significantly impacted by the Bali Bombing includes West Nusa Tenggara (Lombok Island) and some rural areas of East Java Province. The demand for typical Lombok handicrafts decreased by about 50 percent, and Lombok residents working in Bali had to close their businesses to minimize losses. Wood, metal, granite, and bamboo industry entrepreneurs in East Java, who supply raw materials for handicrafts, also reduced their supply to Bali (UNDP, 2005).

The IFLS3 (Indonesia Family Life Survey 3rd period) and IFLS4 data illustrate the average income levels of individuals affected by the Bali Bombing and those who were not, in the years 2000 and 2006. As shown in Table 1, the average income level in 2000 was relatively similar between the affected and unaffected areas. However, a notable difference occurred in 2006, the average income showed a gap of up to 1,191,096 rupiahs between individuals in the affected areas and those in unaffected areas.

Table 1. Estimation of Individual Income in the Bali Bombing Impacted Areas and Surroundings, 2000 and 2006

Individual Income	Impacted (2000)	Not Impacted (2000)	Impacted (2006)	Not Impacted (2006)
Observations	1,360	742	1,753	1,359
Minimum	1,432,000	1,408,000	1,451,000	1,440,000
Maximum	48,000,000	43,500,000	96,000,000	95,800,000
Average	5,072,446	5,097,917	8,756,500	9,947,596
Std. Deviation	4,292,495	4,714,933	9,766,949	10,200,047

Source: Author's calculation based on IFLS3 and IFLS4 data.

e-ISSN 2721-625X
ISSN 2721-6330

Impact of the Bali Bombing on Individual Income Differences

Figure 2 illustrates the estimated individual income in the affected (Bali and West Nusa Tenggara) and unaffected (Yogyakarta and Banten) areas in 2000-2007 using the inflation approach. It can be analyzed that during 2000-2002 there was a tendency for the average individual income in the bomb-affected and unaffected areas to be the same. However, after the bombing in October 2002, the movement of individual income in the affected areas was flatter and provided a gap with the movement of income in the unaffected areas. The gap widened in 2006, this year after the second Bali bombing on October 1, 2005. From this part, it can be shown that the parallel trend assumption has been met and based on the Haussman test, the endogeneity assumption has also been met.

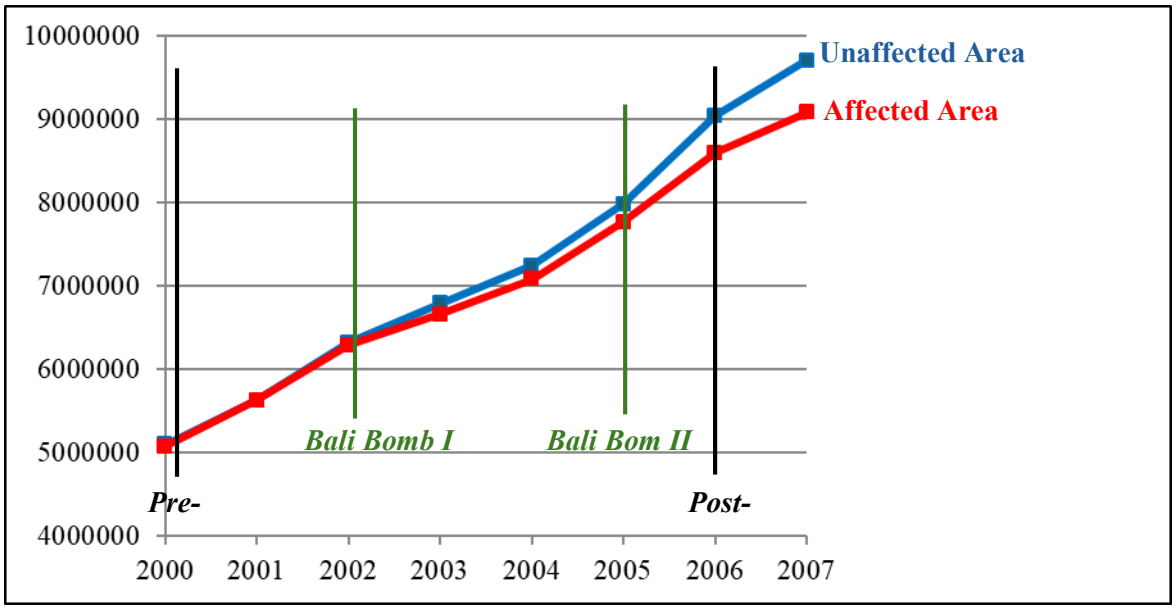

Figure 2. Average Individual Income in the Bali Bombing Affected and Unaffected Areas, 2000 – 2007 with an Inflation Approach
Source: Author's Calculation

The estimation results in model 1 in table 2 represent the pure Difference in Differences (DiD) without including explanatory variables, while in model 2, it can be shown that by incorporating the interaction variable for individuals directly impacted, the estimated impact of the Bali Bombing tends to reduce the average income difference between affected and unaffected areas after the second bombing. Specifically, the income difference decreases from 17.71 percent to 16.39 percent. Individuals who directly experienced the impact of the Bali Bombing tend to have 47.38 percent lower average

e-ISSN 2721-625X
ISSN 2721-6330

income compared to individuals in unaffected areas. This is consistent with the findings of Brata (2017) that the impact of a natural disaster affects socio-economic conditions that are spatially distributed. The closer to the disaster's epicenter, the greater the impact experienced. Individuals who directly felt the effects of the Bali Bombing face a greater risk of bearing the financial loss.

The precision of the estimates and the reduction of model bias can be improved by including explanatory variables in the model (Netter et al., 1989). After including nine explanatory variables in the model, the estimated impact of the Bali Bombing on individual income in the affected areas increased. The magnitude of the impact is around -0.2644, meaning that the average income of individuals in the affected areas after the second Bali Bombing is approximately 26.44 percent lower than the average income of individuals in the unaffected areas. Model (4) shows a tendency for a reduction in the impact of the Bali Bombing on individuals directly affected when compared to the estimation without explanatory variables. The average income of individuals directly affected in the impacted areas after the second Bali Bombing is about 36.33 percent lower than the average income of individuals in unaffected areas. The standard error of the estimate is smaller than in previous estimations, indicating improved precision and reduced bias.

Table 2. Estimation of the Impact of the Bali Bombing I and II on the Individual Income in Bali and West Nusa Tenggara Using Modified DiD

Dependent Variables: Individual Income (ln)	**Model (1) Pure DiD**	**Model (2) Modified DiD**	**Model (3) DiD + Controls**	**Model (4) Full Model**
Bombing Region	-0.1771 ***	-0.1639 ***	-0.2752 ***	-0.2644 ***
	(0.044)	*(0.044)*	*(0.040)*	*(0.040)*
Direct Impact		-0.4738 ***		-0.3633 ***
		(0.109)		*(0.099)*
Bali Etnic			0,0189	0,0040
			(0.029)	*(0.029)*
Years of Schooling			0.0521 ***	0.0521 ***
			(0.002)	*(0.002)*
Men			0.0050	0.0046
			(0.023)	*(0.023)*

e-ISSN 2721-625X
ISSN 2721-6330

Dependent Variables: Individual Income (ln)	Model (1) Pure DiD	Model (2) Modified DiD	Model (3) DiD + Controls	Model (4) Full Model
Age			0.0058 ***	0.0057 ***
			(0.000)	*(0.001)*
Work			0.1931 ***	0.1948 ***
			(0.032)	*(0.032)*
Urban Area			0.0650 ***	0.0614 ***
			(0.020)	*(0.020)*
Welfare			0.2119 ***	0.2093 ***
			(0.024)	*(0.024)*
Marriage			0.1456 ***	0.1459 ***
			(0.024)	*(0.024)*
Head of Household			0.0795 ***	0.0810 ***
			(0.025)	*(0.025)*
dummy pre-post	*yes*	*yes*	*yes*	*yes*
dummy with-without	*yes*	*yes*	*yes*	*yes*
observations	*5,214*	*5,214*	*5,214*	*5,214*

*Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*
Source: Author's Calculation

In addition, individuals residing in urban areas tend to have a higher average income, approximately 6.14 percent more than those living in rural areas. Individuals from wealthier families have an average income 20.93 percent higher compared to those from less affluent families. Regarding marital status, married individuals tend to have an average income that is 14.59 percent higher than those who are unmarried.

Impact of the Bali Bombing on Income Groups

The distribution of individual income groups is closely related to the general welfare distribution of a region. Based on 2005 Susenas data, the income distribution in Bali Province for the low-income group was 20.14 percent; middle-income 37.66 percent; and high-income 42.20 percent. This distribution reflects the proportion of the population based on income levels. IFLS data shows that 19.73 percent of the population belong to the low-income group, 39.78 percent to the middle-income group, and 40.49 percent to the high-income group.

e-ISSN 2721-625X
ISSN 2721-6330

Table 3. Estimation of Individual Income Gorups in Bali Province Based on Susenas and IFLS Data, 2005 (%)

Individual Income Groups	Susenas (%)	IFLS (%)
Low Income	20.14	19.73
Middle Income	37.66	39.78
High Income	42.20	40.49

Source: Author's calculation based on Susenas (2005) and IFLS (2005) data

From table 4, only individuals in the middle-income group were significantly affected by the Bali Bombing I and II. The impact is -0.0412, meaning that the average income of individuals in the middle-income group in affected areas after the Bali Bombing II was 4.12 percent lower compared to the average income of middle-income individuals in unaffected areas. Individuals directly affected by the Bali Bombing in the affected areas have an average income was 18.44 percent lower than those who were not directly affected.

Considering the large proportion of the population in the middle-income group (almost 40 percent), external shocks can have a significant impact on the overall economy. The middle-income group, being the largest contributor to the economy, is also the most vulnerable. Nizar (2015) in his study shows that the growth of the middle class is rapid (up to 6.7 percent per year), but individuals in this group are very vulnerable to falling back into poverty if they cannot withstand economic challenges. The large middle-income group is considered a promoter of development because it provides many entrepreneurs who create jobs and increase productivity. Additionally, the demand for consumer goods is also high in this group, which ultimately drives the economy faster.

Table 4. Estimation of the Impact of the Bali Bombing I and II on Individual Income in Bali and West Nusa Tenggara by Income Group

Dependen Variable: Individual Income (ln)	Total	Lowest 40%	Middle 40%	Highest 20%
(1) without explanatory variables				
Bombing Region	-0.1639 ***	-0.0172	-0.0412 *	0.0598
	(0.044)	*(0.029)*	*(0.024)*	*(0.052)*
Direct Impact	-0.4738 ***	-0.0078	-0.1844 **	-0.3667
	(0.109)	*(0.054)*	*(0.074)*	*(0.032)*

e-ISSN 2721-625X
ISSN 2721-6330

Dependen Variable: Individual Income (ln)	Total	Lowest 40%	Middle 40%	Highest 20%
(2) with explanatory variables (not displayed)				
dummy pre-post	*yes*	*yes*	*yes*	*yes*
dummy with-without	*yes*	*yes*	*yes*	*yes*
observations	*5,214*	*2,111*	*2,074*	*1,029*

Standar error in parenthetes, *** significant 1percent, **5percent, *10percent
Source: Author's calculation based on Susenas (2005) and IFLS (2005) data

The Bali Bombings had a negative impact on the economic order of Bali Province and its surrounding areas, particularly in the tourism sector. This impact can be viewed from two perspectives: the effect on all individuals within the bomb-affected areas and the effect on those individuals who directly suffered socio-economic losses due to the social conflict that occurred. Following Bali Bombing II as a simultaneous effect of Bali Bombing I, the average income of individuals in the bomb-affected areas was lower compared to the average income of individuals in unaffected areas. More specifically, individuals who directly experienced losses due to the social conflict in the bomb-affected areas had much lower average incomes compared to others who did not suffer losses, both within the affected and unaffected areas. The higher the level of education completed, the higher the income tends to be compared to individuals with lower educational levels. Additionally, individuals from wealthier families tend to have higher income levels compared to those from less wealthy families. From the perspective of income distribution, individuals in the middle-income group experienced the greatest impact from the Bali Bombings. The contribution of middle-income individuals to the development process is substantial. The high demand for consumer goods, the large labor supply, and the increasing savings rate are key reasons for the importance of more intensive development of the middle-income group. Several targeted programs to help middle-income groups whose incomes have decreased due to the impact of social conflict should be adaptive, inclusive, and sustainable, namely Conditional Cash Transfer, Encouraging the use of basic services (education, health) and maintaining purchasing power, Temporary Subsidies for Basic Needs, Subsidies for electricity, fuel, basic necessities, or transportation for affected groups, Maintaining stable household consumption during the crisis, Training and Reskilling Programs, Micro Business Capital Support, Tax Incentives or Reduction of Obligations, establishing Economic and Psychosocial Counseling Centers.

e-ISSN 2721-625X
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The reconstruction and recovery process post-tragedy must be carried out immediately, given the significant potential of the areas where people rely on their livelihoods. The middle-income group is more likely to be employed in the secondary sectors of the economy. These sectors should be the focus of development and reconstruction, including trade, transportation, communication, and small-medium industries. Economic recovery after a terrorist bombing attack is a complex process that requires time. The immediate impact of the attack includes infrastructure damage and a decline in economic activity, while recovery requires significant costs and support from various parties, including the government and the international community. Factors such as political stability, the existence of an effective security system, and private sector support have a significant impact on the speed of recovery. While full recovery can take years, countries with strong economic and social structures are better equipped to cope with the long-term impacts of terrorism. (Papageorgiou, A., 2022)

CONCLUSION

This study demonstrates that the Bali Bombings had a significant negative impact on individual incomes in the affected areas, particularly among the middle-income group, which plays a key role in local economic growth. Individuals who directly experienced socio-economic losses had lower incomes compared to those unaffected, and both education level and family wealth positively influenced income. These findings highlight the need for adaptive and sustainable economic recovery policies, such as conditional cash transfers, basic needs subsidies, training and reskilling programs, and microbusiness support, especially for the most vulnerable middle-income group. Theoretically, the results strengthen understanding of the relationship between social conflict, income distribution, and local economic resilience. Although economic recovery requires time and multi-stakeholder support, targeted policy interventions can accelerate reconstruction and mitigate post-disaster income disparities.

LIMITATION AND RECOMMENDATION

This study has some limitations, including the fact that the event discussed occurred quite some time ago, although it can still serve as a benchmark for similar incidents or other shocks. The IFLS data used refers to the time when the shock occurred. There is no

e-ISSN 2721-625X
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available IFLS data after 2014. For future research, it is recommended to use more recent and representative pure panel data, such as IFLS, for a more up to date period.

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