The Economic Impact of Shelter Assistance in Post-Disaster Settings

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Richard Hill
Director – Emergency and
Transition Programs,
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Executive Summary

Assisting a population in its ability to recover economically from disaster is now one of the most important goals of humanitarian relief. Relief programs can produce a range of stimuli to the local economy, from jobs to housing construction or administration of a relief program, to purchase of relief supplies and commodities locally or to specific programs that create jobs. Occasionally, these programs help build incomes based on new opportunities that become part of the economy once the relief phase is over, but, more often, the stimulus ends when the relief agency leaves.

Shelter projects often represent a large portion of the relief programming implemented in post disaster settings and are seen to provide a range of stimulus to the local economy and to household incomes. Informed decisions regarding the investment of limited relief funds in shelter, and how to design such programs for a particular context, requires an understanding of the economic dynamics surrounding the provision of shelter materials, shelter construction and the role of shelter programs in the development process.

This report addresses the impact of emergency shelter programs in the development of post-relief economies and in building incomes of affected populations. It provides a review and analysis of the available literature relevant to understanding the economic impact of emergency shelter programs, additional research conducted by CHF International on income development of beneficiaries of emergency

shelter programs, and the first steps toward rigorous and accurate measurement of the impact of these programs on the incomes of beneficiaries. Each of these analysis provides information useful to future programmers of relief assistance.

Literature Review

Almost no research or analysis specifically addresses the economic impact of emergency shelter. The most relevant and significant quantitative analysis addresses economic dynamics related to the construction of and use of housing by low income populations in the developing world, and usually does not focus on shelter provided in response to a disaster. Populations recovering from disasters are affected by dynamics that are not present in unaffected communities. However, poorer populations recovering from disasters typically utilize economic strategies that are similar to those of unaffected populations of a similar economic level; and critical economic dynamics are similar. Thus, much can be learned about studies of the relationship between shelter and economic development of low-income populations, even if the study does not address a population recently affected by disaster.

This report divides the analysis into two broad categories: backward and forward linkages. Backward linkages refer to the direct economic stimulus that occurs from the production of the shelter itself and the purchase of inputs for its production. Conversely, forward linkages discuss the effects shelter provision has on factor productivity in the economy, on the consumption patterns of the receiving households, and as productive capital in its own right as a workplace.

The economic impact of shelter construction through backward linkages has been analyzed through three lenses. These consider increased incomes as a result of shelter construction, increased economic activity stimulated by demand for materials used in shelter construction, and measurement of general economic growth attributed to building.

The report identifies six primary categories of economic impacts through forward linkages. These include:

1) An increase in output of textiles, furniture and household fixtures,
2) Stimulated development of an array of service trades,
3) Development of training for required construction skills,
4) The use of shelter as a rent saving mechanism,
5) Increased productivity of workers, and
6) The development of home based enterprise activities (HBE).

This last factor has received the most attention of researchers and analysts and is often considered the most important way that shelter can support economic development in post-disaster societies. Two recent studies document a significant role for the HBE income building strategies in emergency shelter. The role of HBEs

in developing economies not directly affected by disaster – especially in the low-income sectors – is well demonstrated. Most researchers believe that the HBE and other informal income mechanisms are the single most important strategy for these populations. Additional consideration is given to forward linkages and employment, development of support and service sectors of the economy, the use of shelter for capital formation, and the importance of capital in building income.

The report also compares differences in program design as related to interventions in complex emergencies versus natural disasters. In complex emergencies societal economic structures have often been completely worn down or no longer exist as a result of years of conflict. In contrast, natural disasters represent a "shock" to the local economy and society, but do not normally cause a complete breakdown of either. As a result of these significant differences, a shelter program should account for the difference in socio-economic infrastructure and emphasize backward linkages or forward linkages in order to maximize economic benefit.

Impact of Shelter on Household Welfare

Many of the studies cited in this report lack direct empirical evidence of the economic impacts of providing emergency shelter or have empirical evidence drawn from economic situations that differ in significant ways from the context of an emergency. A rigorous assessment of the effect of emergency shelter on income requires two features: first, the data must include information on incomes before and after the emergency that has necessitated the provision of shelter; second, the data must include information on both households that received shelter assistance and households that have not received assistance.

CHF conducted household surveys at three sites at which some form of emergency shelter was provided to households during the past three years in Sri Lanka, El Salvador, and Colombia. Interviews were conducted in the field during the time period of February through April of 2004.

For the data samples collected in each country, three models were created for a multivariate analysis:

1) A simple linear model that relates the percentage increase in household income to shelter assistance, household size, the age of the head of household, and an assessment of household vulnerability,
2) A model that examines the logarithm of the increase in income to the dichotomous variables (such as shelter and vulnerability status),
3) and the logarithm of other variables (such as household size or age of the head of the household).

In all three cases, there is an increase in household welfare over time. In El Salvador, data show a multiplier of 6.2 or higher (investment of $1 million in the

provision of emergency shelter results in increased income flows that are equivalent to household income increase of $6.2 million). In Colombia, a multiplier of 10 or more, and in Sri Lanka (with a significantly shorter time frame – less than one year) a multiplier of 1.6 – 3.2.

Findings and Recommendations

The economic impact of provision of shelter in post-disaster situations is understood to derive from both backward and forward linkages. The former are generally better understood and more frequently modeled than the latter. The impacts resulting from backward linkages are likely to be enhanced by reliance on locally produced and procured materials, and local labor for construction. Even with such strategies in place, the impacts themselves seem to be relatively modest at the local level, although potentially important to the national economy.

The impacts from forward linkages have been less comprehensively studied, but new understanding is beginning to emerge from a variety of sources. For example, recent research on the importance of home-based enterprises (HBEs) suggests that this source of income is enabled through the provision of shelter and is *the single most important income source for the populations most affected by disaster.*

The survey instrument devised through this project has been applied in three different settings, and statistical models have been estimated to provide an understanding of the link between changes in household income and the provision of shelter assistance.

Calculations based on the survey conducted by CHF as well as the evidence, analysis and data from the relevant literature to date suggest several findings:

1) Families provided with shelter post-disaster typically attain a significantly higher increase in income than those families who are not provided with shelter[1].
2) Investments in emergency shelter provision provide significant returns, generating a payback conservatively valued at 3 to 8 times the value of the initial investment.
3) Even for the programs serving the poorest and most vulnerable, and given only a short time for benefits to emerge, shelter provision appears to return considerably more than the initial investment.
4) The benefits of shelter last beyond the emergency assistance period. These include positive affect on increased income and family health.
5) The benefits from shelter provision appear to be larger after a period of a year or two has passed to enable forward linkages in the economy (e.g.

[1] This finding is based on this study's analysis of data collected from three post-disaster shelter provision programs. Results are analyzed with an accepted multi-variant econometric model that adjusts results for a range of variables affecting income such as age, presence and number of children, etc.

the use of shelter as a platform for business, investments as a consequence of rent-saving, or inducements for a range of trades serving the investments in the home).

6) The role of shelter as capital is particularly important in accelerating development and increasing incomes, but is typically unappreciated, particularly among post-disaster program planners.
7) Beyond capital, but linked to it, the role of shelter as an overall platform for increasing incomes – with links to key ingredients for income improvement such as credit, training, agricultural support, small business development – is underappreciated as well.

The report suggests the following next steps for future research and analysis:

1) Standardize the processes and tools for data collection on economic impacts of the delivery of post-disaster assistance.
2) Understand better the relationship between disaster, IDP and refugee movement, and urbanization, as well as the economic strategies of those affected by disaster as they congregate in camps or integrate into urban settings and urban economies.
3) Understand better the role of capital in economic assistance to those affected by disaster. Associated with this is the role of ownership of land, property, or other means of production, and the ways that poor populations (and particularly forced-migrant and transitional populations) cope with the many tenure issues that affect their ability to develop capital and entrepreneurial bases.
4) Compare economic impact of shelter to other mechanisms meant to build incomes of beneficiaries and the strength of economic recovery post-disaster.

Introduction

Evaluating the economic impact of emergency shelter provision may strike some observers and policy makers as asking the wrong question. When a disaster, whether of natural or human origin, strikes and leaves people homeless, it is logical to intervene and provide shelter for those who need it. The motivation for this activity is argued to be ethical in nature, not economic.

Yet, for more than 30 years, the international humanitarian aid community has been reflecting on the impact of emergency relief programs on the societies that these programs are designed to assist. *The Economics of Natural Disasters*, by Douglas Dacy and Howard Kunreuther, considered alternative federal government policies and their impact on economic recovery in affected communities.[2] In the context of developing economies, the examination began in earnest with the publication of Fred Cuny's *Disasters and Development,*[3] followed by Anderson and Woodrow's *Rising from the Ashes: Development Strategies in Times of Disaster*,[4] both of which clearly showed how inappropriately programmed relief assistance can prolong economic hardship and suffering for vulnerable populations, undermining their ethical goals. In the years since, analysis has brought into sharper

[2] Dacy, Douglas C., and Howard Kunreuther. *The Economics of Natural Disasters*. Free Press: Macmillan, 1969.

[3] Cuny, F. *Disasters and Develoment*. Oxford University Press, 1983.

[4] Anderson, M and Woodrow, P. *Rising from the Ashes: Development Strategies in Times of Disaster.* Lynne Rienner Publishers, 1989.

focus the distinction between the assistance required to save lives and reduce suffering, the type of assistance required to prevent societies from cycling back into a state of emergency, as well as an effective method to assist these groups to work toward economic and social growth. It is now well accepted that an additional and important goal of immediate assistance is the development of a society that can resist the impact of subsequent disastrous shocks.[5]

Cuny, Anderson, and Woodrow point out that in most cases relief assistance plays an important role in the developmental processes and goals described in the paragraph above. The skillful use of relief assistance can serve both social and economic processes that strengthen society. These authors and other development analysts have argued that the relief phase cannot be separated from the development phase, and that failure to address the goals of stronger social and economic systems in the early stages of the relief process will usually leave the society less able to grow sufficiently to resist the next shock. This understanding is now generally accepted in the relief and development community, and most implementing organizations now program relief assistance with the objective of also addressing development goals. The term now most often used to describe this is *developmental relief* programming.[6]

Developmental relief programs attempt to build both social capacity and economic strength. The most successful of these programs acknowledge that not only are the two connected, but also that they can and should be addressed simultaneously. Among the most pernicious dynamics that can occur when relief is delivered is the reduction or removal of momentum towards economic development. Development of dependency mentalities among beneficiaries of relief, undercutting normal markets, economic activities that include a large infusion of "free"

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[5] While most practitioners now agree that concern regarding the economic impact of humanitarian interventions is warranted, a few words on the role of humanitarian motives is appropriate. We might view the impact on economic activity, as part of the reason there is an ethical mandate to provide assistance in an emergency. Part of our natural concern is the impact of the emergency on the society's ability to produce goods and services, and offer livelihoods for its members. Evaluating the ability of an intervention to meet what we regard as an ethical mandate requires that we consider the effectiveness of the intervention in revitalizing the local economy. Finally, if there are currently insufficient resources available for providing assistance in all emergency situations, this is not because there are simply insufficient resources among all the developed countries of the world for meeting the basic needs of people who find themselves without basic necessities in emergency situations. It is, rather, because these countries have chosen not to devote the required resources to groups or agencies that provide the required aid. It is at least possible that providing an evaluation of the economic impacts of providing emergency shelter will persuade donor countries to increase the resources they commit to providing assistance.

[6] The discussion about development and disasters is framed here in disaster response. Most professionals also note the inter-relationship between the likelihood of a disaster, shelter construction and the decision where to site shelter. In a recent overview of this issue (*Reducing Vulnerability through Livelihoods: an Initial Examination for Potential Mitigation and Post-Disaster Application*), Charles Setchell summarizes trends that lead to greater vulnerability, one of the greatest of which is the increasing populations in the developing world that live in highly vulnerabile situations.

supplies and food, and failure to address some of the key obstacles to the recovery of important economic processes are frequently cited as the most common and damaging effects of poorly programmed relief.

Relief programs typically focus on the basic needs - access to healthcare, food, and shelter. In developed nations, these services are maintained by the resources of the disaster-affected persons, as well as the contingency mechanisms specifically developed to support recovery. In societies where relief organizations operate, the target population does not have sufficient incomes or savings to address basic needs in an emergency. Moreover, in most cases the ability to produce income is severely curtailed or destroyed by the disastrous event. For example, a family's place of business may be destroyed, including the rooms or building that they used for manufacture and the equipment used to conduct a business. Or, the source of employment may be shut down or unusable due to impact on the infrastructure.

Relief programs produce a range of economic inputs as well as provide basic needs, sometimes as interventions focused on fulfilling economic gaps, and sometimes as the by-product of the main relief activity. For instance, in most economies targeted by relief, there are jobs provided to the local population by the relief agencies. The construction of relief agency facilities, the food and living requirements of agency personnel, and the local purchase of large quantities of relief goods can help support local economies.

Most of these inputs are completely consumed by the time the relief operation is declared over and the agencies leave. Increasingly cognizant of the role that relief can play in the economy, and appreciative as well of the shock that can occur when a relief-agency economy suddenly ends, many agencies develop programs intended to rebuild an economy that will carry on after the relief phase. Most often these programs focus on inputs that will create jobs and income strategies for the affected population. The strategies will not be dependant on relief-agencies and will typically be similar to the strategies that existed before the disaster. Occasionally these programs help build incomes based on new opportunities that become part of the economy once the relief phase is over, for example, a sawmill that is developed to process fallen trees after a hurricane, remains as a mill to serve the lumber industry.

Shelter projects represent a large portion of the relief programming that is implemented in post-disaster settings, and they are subject to all the issues described above. Understanding the economic dynamics surrounding the provision of shelter material, shelter construction, and the role of shelter programs in the development process is imperative to understanding both whether to invest limited relief funds in shelter, as well as how to approach program design in any given context. This report addresses the impact of emergency shelter programs in the development of post-relief economies and in the income development of affected populations. It provides:

1) A review and analysis of the available literature relevant to understanding the economic impact of emergency shelter programs,
2) Additional research conducted by CHF International of income development for beneficiaries of emergency shelter programs, and
3) The first steps toward rigorous measurement of the economic impact of these programs in a way that will be useful to future programmers of relief assistance.

At the onset, this study faces two issues of scope and approach:

Emergency Shelter – A Definition.

Shelter responses in emergencies run the gamut. Over the past 10 years, responses have been as simple as the provision of plastic sheeting and waterproofing existing structures, or supplying assistance with rudimentary mud construction. In other cases, "emergency" assistance has been used to repair and reconstruct significant masonry structures costing tens of thousands of US dollars.

Most literature providing significant evidence on economic impact will refer to structures that involve a reasonably durable roof on a shelter that is intended to be occupied for an extended period of time. The studies on economic impact that focus on emergency shelter examine the economic impact of the provision of shelter constructed from heavy woven plastic sheeting and corrugated iron roofs.[7] The CHF study also includes transition shelters that utilize clay bricks for walls and wooden frames (see *Impact of Shelter Provision on Household Welfare* below).

Measuring Economic Impact

Both practitioners and those who study emergency relief practices use a range of approaches and definitions in their attempts to address economic impact of relief and development programs. This report examines the impact on beneficiary incomes and on the economic development of the affected area. The first, being more discrete, can be measured with some accuracy using household surveys and the close monitoring of economic activity. As part of this research, CHF International undertook a study of increase in income, as a result of provision of shelter post-disaster. Methodology for that study and results, as well as additional discussion of the general methodological issues surrounding the measurement of economic impact of shelter on household income and welfare are discussed in this report under *The Impact of Shelter Provision on Household Welfare*.

[7] See CHF International, 2004; Saunders, 2002. The use of a heavy woven plastic sheeting as a standard response in emergency shelter assistance has accelerated in the past 15 years. This sheeting is typically engineered for strength, UV resistance, and resistance to flame. A preliminary survey by the authors indicated that major emergency response agencies distributed over 5.5 million square meters plastic sheeting in 2003.

The second is considerably more difficult, given the data-poor environments in which relief activities typically take place. Measuring the economic development of the affected area requires adequate baseline data on local economic output (local GDP), a uniform definition of what constitutes the local economy, an accurate measurement of loss as a result of the disaster, as well as tracking all the external inputs into the economy, by sector, stemming from the disaster. Furthermore, similar data is required at regular time intervals following the disaster period.

Literature and Evidence to Date

Few analysts have examined the issue of the economic impact of shelter provided to address needs created by a disaster. The most relevant and significant quantitative analysis addresses economic dynamics related to the construction of and use of housing by low-income populations in the developing world, and usually does not focus on shelter provided in response to a disaster. Populations recovering from disasters are affected by dynamics that are not present in unaffected communities. However, poorer populations recovering from disasters typically utilize economic strategies that are similar to those of unaffected populations of a similar economic level; the critical economic dynamics are similar. Thus, much can be learned about the relationship between shelter and economic development of low-income populations, even if the study does not address a population recently affected by disaster.

The economic impact of emergency shelter can be divided into two broad categories. The first is the direct economic stimulus that occurs from the production of the shelter itself and the purchase of inputs for its production. The magnitude of these impacts (or the size of the "multiplier") depends on the patterns of trade in the economy and its geographic distribution, the propensity (or necessity) to import labor or construction materials, and the consumption decisions of those who receive the income from producing these inputs. The impacts in this first category are sometimes referred to as those deriving from "backward linkages".

The second category of impact is derived from the effects that shelter provision has on factor productivity in the economy, on the consumption patterns of the receiving households, and from shelter as productive capital in its own right, as a workplace. Because these impacts emerge after provision of the shelter, they are sometimes referred to as "forward linkages."[8] Whether by enhancing labor productivity through provision of a safer environment that satisfies basic needs, or through the provision of a workplace, or simply through greater household purchases of goods and services, these impacts can be estimated in principle as increases in the incomes, and thus expenditures of recipient households relative to households who do not receive the assistance.[9]

Backward linkages

In addressing the impact that shelter construction can have, analysts have focused on three areas of impact:

1) Increased incomes as a result of shelter construction,
2) Increased economic activity stimulated by the increased demand for the materials used in shelter construction, and
3) Overall measurements of economic growth attributed to building.

EMPLOYMENT AND INCOME. The most relevant studies that document the relationship between housing and employment as a direct result of the home construction come from two recent studies by NGOs. The CHF International study of its Cooperative Housing Program in Poland from 1992 to 1999 indicated that construction of condominium units at a total cost of approximately US$20,000/unit created 21.55 person months of employment, representing US$11,162 in income per unit.[10] This figure represents labor directly applied to construction of the unit, and the study did not measure incomes and labor in secondary and tertiary industries such as the manufacture and transport of materials.

Graham Saunders' analysis of a Catholic Relief Services (CRS) emergency shelter program in Goma, Democratic Republic of Congo, shows the creation of 14,000 person/days of labor for the creation of 11,307 units of shelter. Each unit

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[8] Only one rigorous econometric analysis of this relationship has been conducted. CHF's 2004 study of impact of post-disaster shelter provision on household welfare is discussed later in this document.

[9] Setchell's *Reducing Vulnerability through Livelihoods: An Initial Examination for Potential Mitigation and Post-Disaster Application* is the most recent comprehensive analysis of economic impact of emergency shelter. In his analysis of shelter livelihoods, disaster and shelter, he developed much of the basis for the economic approach and analysis used here.

[10] CHF International, *Assessing Economic Development Impact of a Housing Program (On the Example of the CHF-Poland Project 1992 to 1999 and Beyond.* CHF internal document, February 2000.

was 4x4 meters, and constructed from wood frames, plastic sheeting, and sheets of corrugated iron – each unit cost US$180.[11]

The construction of shelter has an economic impact beyond the employment generated in the construction of the shelter itself. Several analysts have looked at the effect the construction sector has had on income in the developing world, and their conclusions vary. Two studies provided rough multipliers for employment and income. One suggests that for secondary job creation, one job in the construction sector sustains one job in a supporting sector (transport, supplies manufacturing, etc.,[12] indicating a multiplier of two. A study of housing construction in Costa Rica from 1982 indicated 400 units of output in a related sector in the country for every 1,000 units expended in construction. These issues will be discussed in more depth below.

Clearly, construction programs support a range of other economic activities – primarily construction materials manufacture and transport. Two analysts provide a more detailed examination of the dynamics between various economic activities and income generation in the developing world – primarily focusing on the relationship between processes that utilize locally produced materials and those that do not.

Piet Rietveld, in his 1992 study of the Indonesian housing sector, examines the relationship between the housing sector and employment generation, and relates this to technology and material selection.[13] Rietveld identifies three key factors: the percentage of imports of the goods used in constructing the house, the output per worker, and substitution elasticity for workers in home construction.

Rietveld demonstrates that economic activity that acquires inputs from the local construction sub-sectors will have a greater impact on generating local employment. For example, in the Indonesian case, wood products have an import intensity of 2.5%, as opposed to the 49.7% of structural metal products (see Figure 1). As a result, housing construction that takes place utilizing those materials with low import intensities (local products), will result in significantly greater demand for the local industry, and will translate into increased domestic sub-sector growth.

However, propensity to import materials is not the only factor in employment generation in a given sub-sector. Rietveld cites Poot in a separate study that examines employment elasticity, defined as "the relative change in employment as a consequence of a relative change in output."[14] The higher the output per worker,

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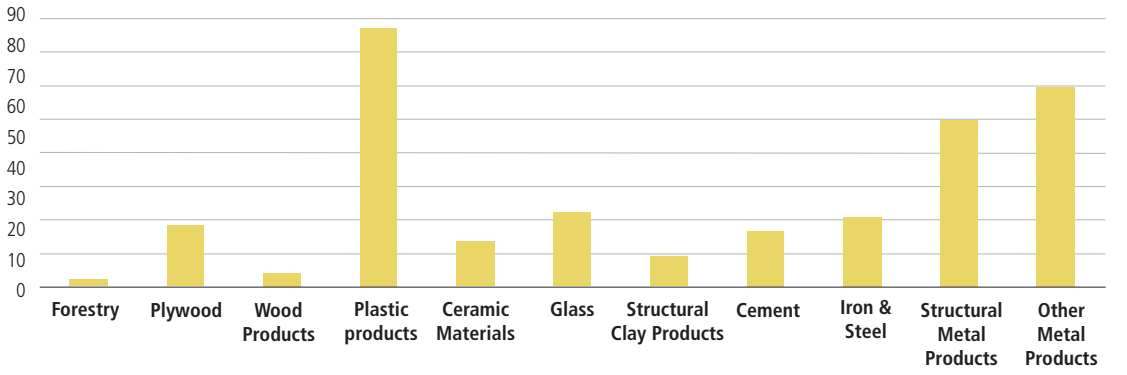
[11] Saunders, G. "Housing, Lives & Livelihoods: Lessons in Post-Disaster Assistance from Goma." Catholic Relief Services Emergency Response Team Report. Catholic Relief Services, Baltimore, 2002.

[12] UNCHS (Habitat) – ILO: *Shelter Provision and Employment Generation*, UNCHS: Nairobi (1995).

[13] Rietveld, P. "Housing and Employment in Indonesia: Prospects for Employment Generation in the construction Materials Sector." *Bulletin of Indonesian Economics Studies*, Vol 28 No 2 August 1992.

[14] Poot, 1988.

FIGURE 1. Import Intensities of Various Construction Sub-Sectors in Indonesia (%)



in terms of cash value, the lower the employment effect (Figure 2). Thus, investment in housing that utilizes capital intensive technologies has a less positive effect on aggregate employment than the same investment that utilizes labor intensive methods. Rietveld illustrates that "the direct employment effect of a certain amount spent on bricks or tiles is about 40 to 50 times as large as when the same amount is spent on cement."[15]

FIGURE 2. Value Added and Employment in the Indonesian Construction Materials[16]

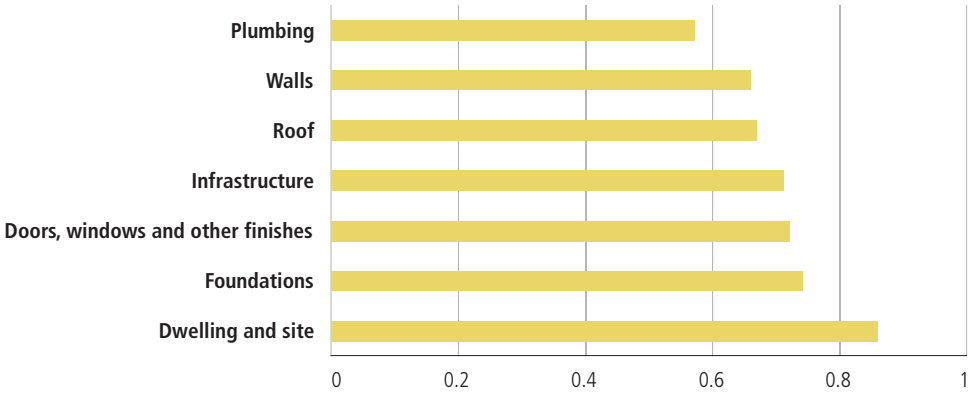
Sector	Value Added (Rp billion)	Employment (thousands)	Value Added per Worker	Employment Elasticity
Forestry	1380	357	3.86	0.5
Other Quarrying	720	280	2.58	0.5
Sawmills	430	280	1.53	0.5
Plywood	460	82	5.53	0.4
Wood and cork products	140	590	0.24	0.7
Paint	50	13	4.21	0.35
Plastic Products	110	60	1.8	0.5
Ceramic materials	60	11	4.82	0.6
Glass	90	12	7.5	0.35
Structural clay products	150	330	0.46	0.65
Cement (and lime)	300	30	10.13	0.35
Other non-metalic building materials	90	104	0.84	0.5
Iron and steel	500	20	24.98	0.15
Structural metal products	310	67	4.7	0.5

[15] Rietveld, P. p. 68
[16] Ibid.

When dealing with disaster situations that primarily affect rural areas, the secondary effects of a shelter program can be even more limited if significant amounts of the construction materials used are manufactured in distant urban centers. Rietveld also points out, however, that the labor-intensive sectors are often dominated by small-scale industries that are prevalent in rural areas, further emphasizing the potential for secondary economic impacts of shelters that utilize local technology.[17]

In another relevant analysis, Paul Strassman looked at the construction of a 24.9 m^2 dwelling among 77 different firms, across seven different developing countries, examining the relationship between skills, income, and levels of employment.[18] Strassman looked at the substitution elasticities for both skilled and unskilled labor inputs. Skills with higher elasticity have a higher ratio of hours worked per unit of pay than skills with low elasticity. As Figure 3 demonstrates, there is a clear relationship between the level of skill required in the process and its effect on employment generation during the construction of the shelter itself. Thus, construction that utilizes a greater percentage of high elasticity trades will produce more employment.

FIGURE 3. Substitution elasticities between unskilled and skilled labor - Seven developing countries



Strassman also contends that increases in worker productivity, however, do not necessarily need to translate into decreased levels of employment. He argues that small increases in worker productivity through worker training can spur hous-

[17] There is no standard for determination of the geographic area that is measured to determine economic impact, and the studies discussed here vary in their definition of this. Strassman and Bulmer-Thomas both try to address *regional* impact, and both conclude that reliable measurement is complex and difficult.

[18] Strassman, W. Paul: "Employment in Construction: Multi-Country Estimates of Costs and Substitution Elasticities for Small Dwellings." *Economic Development & Cultural Change* Vol. 33, No. 2 (p. 396-414), 1985.

ing demand through the translated lower cost of housing. Lower cost of housing will increase demand sufficiently to maintain high levels of employment, even when the construction process shifts to use of more low elasticity skills. In other words, the utilization of skilled labor did not translate into significantly less employment.

In the context of emergency shelter, demand generated by the market of potential shelter consumers may be moot, as demand for emergency shelter is driven primarily by donors and motivated by urgent needs of populations who do not have the means to participate in a market. The decision-maker, if not the consumer, is the donor.

Strassman's contention - that skilled labor can reduce the per unit cost of shelter while not necessarily reducing the levels of employment - must take into account the context of emergency shelter response. Where there is a significant pool of skilled labor among affected populations, utilization of a process requiring higher skill levels must be balanced against short-term gain of providing greater employment through focus on labor-intensive building processes. This does suggest, however, that the inclusion of training into emergency shelter programs can translate into both increased amount of shelter per unit of expenditure, and support reduced costs of housing in the post-emergency phase. In addition, training provides long-term employment benefits, with relatively low short-term sacrifice. Therefore, the potential to have a significant impact on the local economy through forward linkages exists.[19]

This programmatic choice contrasts significantly with the choice to utilize capital-intensive technologies that have both low employment effects and are often imported, and therefore translate into less employment generation per-unit expenditure in the shelter program.

BACKWARD LINKAGES: Regional and National Economic Growth. Relatively little research has been done on the relationship between the economic inputs of housing construction and other aspects of growth in developing economies, and even less on the impacts of emergency shelter construction. Studies that provide some insight into this relationship have been conducted in the developed world, where data is more accessible and reliable. A reasonably complete model and attempt to measure the economic impact of housing was completed by the National Association of Home Builders (NAHB).[20] The NAHB model uses an *interindustry* approach to the calculation of multiplier impacts of new home construction. This

[19] Emergency shelter interventions that take place in the developing world generally serve communities that could be characterized as normally utilizing low-income housing (as the impacts of disasters normally affect more vulnerable populations (see Bertrand, Cuny).

[20]National Association of Home-Builders: "NAHB's Local Impact of Homebuilding Model: Technical Documentation." Washington, DC, November, 1997.

approach provides a superior method of calculating the "backward linkages" of housing construction, accounting for the output and employment impact in a range of industries that supply inputs to housing construction.[21]

Since the goal of the NAHB model is to identify the local employment and income impacts from housing construction in a typical U.S. urban area, the analysis restricts attention to a conservative subset of industries that are judged to be potentially affected by new construction. The analysis tracks 61 industries and 90 commodities, which defines the "local economy," and in addition accounts for impacts on local tax revenues. The study measures the impacts, both direct and indirect, of the construction of 100 single family units in a prototypical US city.

The study concludes that the construction of 100 units yields US$10 million in local income, US$854,000 in local taxes and other government revenue, and 250 local jobs for the 12-month period during which construction occurs. This level of impact seems completely plausible in a typical urban environment where new homes have construction costs ranging from US$120,000 to US$150,000. The analysis suggests that in a typical U.S. urban area, 65 to 85 percent of the construction costs accrue as local income, with the remaining share accruing as income outside of the region.

Once construction is complete there are no further impacts from the construction process itself. However, the 100 families that occupy the homes will support their families' incomes by taking up local employment (65 local jobs according to the study). Given a median family income between US$25,000 and US$30,000 per year, they may potentially raise US$2,780,000 in local income.

The interindustry approach used in the NAHB model provides a more precise and comprehensive method for estimating local impacts of house building. It is important to be aware of the difficulties in applying these results in other settings. The analysis assumes a fixed factor coefficients production technology that does not allow substitution between inputs in response to changes in price. The approach requires estimation of a regional input-output matrix that is difficult even in "data rich" environments such as U.S. metropolitan areas, because it requires estimating the level of trade between producers in each and every industry with those in every other industry and with consumers. Assuming that the interindustry structure is stable and similar to that estimated for the NAHB model, it is necessary to make adjustments for the geographic scale of the analysis. In smaller cities or villages, the multiplier due to interindustry linkages will be much less because of the propensity to import as discussed above. Therefore, projects in small regions should expect less than 65 percent of the construction costs to accrue as local income.

In 2003, the Association of Oregon Community Development Organizations

[21] For a discussion on the use of input-output tables to calculate such multipliers, and the techniques for inferring local or regional interindustry matrices from national tables, see Chapter 4 in *Urban and Regional Economics* by Philip McCann, Oxford University Press, 2001.

(AOCDO) adapted the NAHB model to assess the impact of affordable housing on the local economy.[22] But, by focusing on affordable housing, the study's model places a greater emphasis on rental savings over time.[23] The study examined the impact of construction of a subset of low-income houses initially subsidized by the State of Oregon, and found that local employment and multiplied incomes were slightly less that in the NAHB study. Taxes from increased incomes and property produced for the state a 25.5% annual return on an investment in low-income housing of US$94 million.

Forward Linkages

Housing is not only effective in generating employment and income through the demand created by the construction sector and by other sectors contributing to the building operation, it can also provide a series of intermediate inputs to other economic activities, referred to as forward linkages as explained above.

Much of the discussion which follows focuses on the use of the home as a platform for economic production. In these cases, investment is tied closely to tenure.[24] Tenants of a shelter are unlikely to invest scarce resources in the construction or improvement of a home unless they believe that they will be able to remain in the home long enough to make a worthwhile return on their investment. Thus, title and reliability of long term tenancy are key issues that affect the economic impact that shelter provides. Lack of title (clear ownership) per se does not appear to exclude investment, as reliable long-term tenancy elicits investment in nearly the same way as ownership. Poorer populations also develop strategies contingent on the possibility that they might be forced to leave a shelter. In these populations the investment in income generating resources and home improvements are likely to be removable (e.g. furniture, looms and other small scale manufacturing equipment) that can be carried away when tenancy is terminated. Thus, this report considers shelter that is on property to which the tenets have title, as well as shelter that has unclear title.[25]

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[22] Blatt, J. & Rogers, M. *Economic Impact of Affordable Housing Development.* The Association of Oregon Community Development Organizations (AOCDO), April 2003.

[23] Attention to rent savings (an important component of income management among poor populations) provides increased relevance to the impact of emergency shelter programs. One of the primary advantages of shelter provision for affected populations can be reduced cost of renting accommodation. This is an undocumented aspect of the stress on displaced populations, but most relief professionals would consider it significant.

[24] Modification of shelter or housing has also been seen as a "bottom up approach which seeks to correct some of the deficiencies associated with the top-down, direct production of housing." (Arimah, 1999, p 51). Simply put, in many cases, the provision of housing does not adequately meet the needs (i.e. safety, cultural, economic) of the population it serves and thus tenants choose modification as a means to correct the deficiencies.

[25] In the authors' experience, emergency shelter is most often provided on land not owned by the beneficiaries. These settlements often remain for years and a significant percentage of units will become permanent. See Hill, R., "Marmara Earthquake Economic Recovery (MEER) Project: Temporary Shelter Report."World Bank Project Document, Oct 1999.

There are six primary categories of economic impacts through forward linkages. Housing construction causes:

1) An **increase in the output of textiles, furniture and household fixtures,** the demand for which will increase as people turn their houses into homes. It is important to note that these industries often need small amounts of capital and limited imports and will therefore mostly benefit the local economy.
2) The increased residential area densities sometimes produced by the house construction will have a multiplier effect through their **inducement to an array of service trades**. These services include repairs, maintenance, roads, water supplies, drainage and sewerage, sanitation, waste-management, transport, and trade in food/non-food goods, etc.
3) The role of **training in construction skills** is another forward multiplier often identified by analysts, but relatively little quantified analysis exists examining the effect of training on recovering or developing economies.[26]
4) In addition, shelter nearly always **provides a rent saving mechanism**, which becomes increasingly important as a way to build savings, wealth, and capital for further economic investment in inflationary conditions, which are typical in post-disaster conditions when demand for goods and services is almost always greater than supply.
5) Another forward linkage that is difficult to quantify is the **increased productivity of workers** that takes place as a result of improved living environments. Burns and Grebler point out the consequences of better health, more stable families, improved social climate, less absenteeism from school etc., all of which explain why improved shelter increases productivity.[27]
6) Finally, but perhaps most importantly, the acquisition of shelter **enables people to access increased incomes by providing the platform to participate in home based enterprise activities (HBE).** This area is among the easiest to measure and has received the most attention of researchers and analysts. It is often considered the most important way that shelter can support economic development in post-disaster societies. Also related to this is the evidence suggesting that HBEs assist in redistribution, and

[26] The potentially important role of training vis a vis skilled labor elasticities and their effect on the cost of construction of shelter was discussed above.

[27] Klaassen, L. H., Hoogland J. D., Van Pelt, M. "Economic Impact and Implications of Shelter Investments," pp. 35-59 in Rodwin, L. (ed.), *Shelter, Settlement and Development*, Boston, Massachusetts, Allen and Unwin, 1987. In addition, see also analysis by Ed Glaeser (*The Future of Urban Research: Non-Market Interactions.* Brookings/Wharton Papers on Urban Affairs 2000). Glaeser suggests that people living in close special proximity are more likely to develop human and social capital as well as transfer skills and values among peers.

are an important part of the indefinable but critical role of motivation as an energizer in economic growth. Strassman finds that in low-income neighborhoods HBE operators were the elite, whereas in conventional neighborhoods, HBE operators were the poor households.[28]

Of these six areas of economic impacts through forward linkages, the area most heavily documented by far is the impact of HBEs. The role of a shelter as a platform for economic activity is often overlooked. While only one study documents the role of the HBE in income coping strategies in emergency shelter, practice and experience have shown that these strategies (almost always stuck squarely in the informal economy) typically vary little between low income populations in the developing world and these same populations struggling to regain lives and income post-disaster. Shelter, along with infrastructure, can be regarded as part of the economic production process - as the environment in which economic activity takes place.[29] Given the size of the informal economy in most developing countries, the house as a platform for production is an essential part of overall economic output, typically becoming the primary source of income for a majority of households. More than one study indicates that as much as 85% of those in the informal economy rely on HBEs.[30, 31, 32] Housing provides opportunities for commercial activity, storage, small-scale manufacturing, service industries and retailing.[33, 34] Traditionally, housing is considered consumer spending; however, because of the demonstrated role of shelter in the developing world as a platform for production, investments in shelter can be viewed as productive capital expenditures.

The role of the HBE in developing economies – especially in the low-income

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[28] Strassman, 1986.

[29] UN Habitat and ILO.

[30] The size of the informal economy exceeds 50% of the labor force and produces 40-60% GDP according to Chickering L. and Salahdine M., in *The Silent Revolution: the Informal Sector in Five Asian and Near Eastern Countries*, Ed. by Chickering L. and Salahdine M., (1991), pg 188. Another analyst asserts that the informal sector makes up from 40-70% of total employment: Choguill, C.L. *Crisis, Chaos, Crunch? Planning for Urban Growth in the Developing World,* Carfax Pulbishing. 1993. Farbman estimates that 85% of the households in a city's poor neighborhoods contained productive activities, and that these home-based activities provided 50 per cent or more of a household's income, in Farbman, M., *The Pisces Studies: Assisting the Smallest Economic Activities of the Urban Poor.* The United States Agency for International Development, Washington, DC, 1981.

[31] Rogerson, C, 1996. "Urban Poverty and the Informal Economy in South Africa's Economic Heart-Land," in *Environment and Urbanisation* 8(1), 167-181. Rogerson estimates that in the areas of South Africa that he studied, 85% of informal sector activity comes from HBEs.

[32] Hammock, C.J.; Lubell, H.; Sethuraman, S.V. and Rafsky, W.L., 1981.(Chapter 11) , pp.257-271. *Low-Income Settlement Improvement through Income and Employment Generation and Integrated Housing Programs*. UNCHS(HABITAT). *The Industrial Circumstance of the Urban-Poor in Developing Countries.* Praegu, New York.

[33] Ibid. p. 125.

[34] Arimah, B. "User Modification in Public Housing Estates: Some Findings from the Nigeria Scene." In *Housing Provision and Bottom-Up Approaches: Family Case Studies from Africa, Asia, and South America*. Adenrele Awotona (ed) Ashigate: UK. 1999. p 39-55.

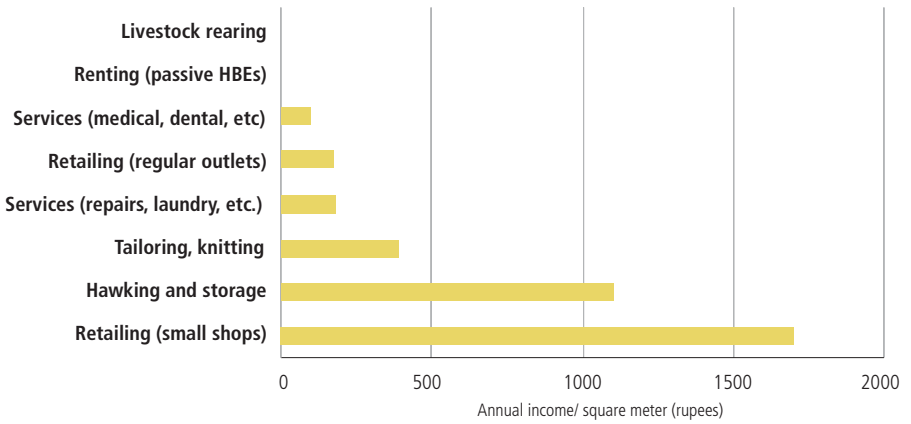
sectors – is well demonstrated. Strassman asserts that in the cities of developing countries. between 10-25% of dwellings have an enterprise on their premises. Moreover, in Strassman's study, 68% of respondents replied that they needed HBEs in order to afford the dwelling and 70% of enterprises could not exist without the available dwelling space.[35]

Studies also provide evidence of the important role of HBEs in providing shelter to populations affected by disaster. Saunders surveyed a post-disaster shelter project that provided wood frames and plastic-sheeting to those affected in the town of Goma.[36] Of the families assisted in this program, 27% used their homes as a base for income-generating activities.

Two studies recently conducted by CHF International also provided data on the role of HBEs for populations affected by disasters. In the Colombia case, the population affected was displaced and was primarily dependent on agriculture to generate their income. Of this population, 13% used their new shelters for HBEs. Between 10-11% of households established a business, taking advantage of the process of constructing the shelters themselves, and 5.5% of households are in both categories – having established a business involved in shelter construction and also using their own shelters for production of goods and services.

Raj and Mitra examined the extent of the role of HBEs in poor areas of New Delhi, India, and analyzed the types of HBEs and their role in the economic development of the city. A significant conclusion of theirs was that the more sophisticated the service provided, the more income it generated. The following chart shows the profitability of different types of HBEs related to the size of the shelter.[37]

FIGURE 4. Profitability of HBEs, the case of Delhi[38]



[35] Strassman, 1986.
[36] Saunders, 2002.
[37] Raj and Mitra, 1990.
[38] Ibid.

Looking at neighborhoods in the same city in the years before 2000, Kellet and Tipple found that the median of the sampled households drew 75% of their income from HBEs, and 60% had no other income.[39] More importantly, they concluded that the rate of return on total capital invested in HBEs is as high as 20 to 50 times the investment made.

Strassman also provides evidence on the role of HBEs as a contributor to household incomes.[40] Figure 5 compares findings from four studies on the percentage of household income from HBEs in low-income neighborhoods in three countries at four different times since the early 1980s.

FIGURE 5. Percentage of Household Income Generated from HBE Activity

Strassman – Lima (1986)	40%
Strassman – Sri Lanka (1987)	45%
Raj & Mitra- Delhi (1990)	56%
Kellet & Tipple- Delhi (2000)	75%

Raj and Mitra also provide data on the timing of the development of HBEs. The average HBE in their survey had started with a 7.3 year delay after the household had moved in. Clearly the transition from simple house to household with an HBE is not automatic. Contrasting this with evidence from the Saunders study and the CHF International studies is the suggestion of a pattern where some families use the HBE as an income strategy in the weeks following a disaster, with HBEs becoming a more important part - in some cases the most important part - of the growth of the economy and in household income over the next several years.

Strassman's analysis also examines the relationship among HBEs, their markets, and their profitability. He concluded that activities addressing only neighborhood sales yielded the lowest incomes, as opposed to ones that operate city-wide and earned the highest incomes.[41] In his 1987 analysis, Strassman concludes that earnings per HBE worker were about one-half of what they would have earned had these people worked outside. He also suggests that the location and the clientele of an HBE are very important. HBEs with markets in low-income neighborhoods almost always produced lower incomes.[42] In these cases, retail earnings fell to a third, and in HBEs operated by women, earnings fell by one-half. If both factors were present, earnings fell by one-sixth.[43] Clearly ability to access markets

[39] Kellet, P. & Tipple, G., "The Home as a Workplace: a Study of Income-Generating Activities within the Domestic Setting," *Environment & Urbanization.* Vol. 12, No1, April 2000.

[40] Strassman, P., 1986.

[41] Strassman, 1986.

[42] Strassman, W. Paul: "Home-Based Enterprises in Cities of Developing Countries." *Economic Development and Cultural Change* Vol. 36, No. 1 (p. 121-144), 1987 p. 135.

[43] Strassman also suggests that HBEs that produce only for local neighborhoods are usually run by members of households that experience twice as much unemployment as the average household with HBEs.

affects the profitability of HBEs, and could figure importantly in plans for citing emergency shelter programs, in order to increase impact on household incomes.

Importantly for shelter planners, the role of subsidized or donor-stimulated shelter is examined by Strassman, who analyzed the relationships among the character of the neighborhood, the proportion of households with HBEs and the type of HBEs and their respective profitability.[44] Popular urbanizations (half-finished dwellings provided by private developers or government agencies) had the highest percentage of HBEs.[45]

Further evidence on the importance of HBEs in household income growth is provided by a recent study by A. Graham Tipple.[46] Based on case studies conducted in four countries – Bolivia, India, Indonesia, and South Africa – the author examines the employment and income of HBEs, and contrasts this income with households without HBEs. Data indicated that HBEs increased employment opportunities for low-income households, especially for women (see Figure 6). At least 50% more women work in households with an HBE than in households without.

FIGURE 6. Household Monthly income (means, PPP£)*

Households with HBE	Bolivia	India	Indonesia	South Africa
Mean	1,067	254	417	464
Median	739	211	277	343
NON-HBEs				
Mean	401	200	307	345
Median	321	171	248	290
Percentage Improvement from HBEs				
Mean	166	27	34	34
Median	130	23	12	18

**PPP represents Purchasing Power Parity and removes differences in purchasing power among different currencies.*

This evidence is complemented by findings by Merrick in a study of Belo Horizonte, Brazil, in 1976. The author found that informal activities, usually HBEs, tended to be overrepresented as economic activities among some groups – specifically the young, the elderly, and the less well educated, as well as the secondary earners in a family, typically women.[47] It is important to note that all of these groups are also typically over-represented in the vulnerable populations that are targeted by post-disaster humanitarian assistance.

While the evidence indicates that no two developing economies are the same,

[44] Strassman, 1986.

[45] Ibid. p. 487.

[46] Tipple, Graham, "Settlement Upgrading and Home Based Enterprise: Some Empirical Data." http://www.unhabitat.org/programmes/ifup/conf/Graham-Tipple.PDF.

[47] Merrick, T.W. "Employment Earnings in the Informal Sector in Brazil: The Case of Belo Horizonte." *Journal of Developing Areas*, 10, pp. 337-353.

and thus suggests caution in applying these findings to other developing economies, the evidence clearly suggests that HBEs play a significant role in economic development in these communities and, in many cases, represents the dominant income strategy in the informal sector of the economy.

EMPLOYMENT OF BOTH FORWARD AND BACKWARD LINKAGES. In the previous section on backward linkages, we examined the role of shelter construction in employment creation. The relationship of shelter construction that can use large amounts of unskilled labor and create jobs is well established. In a study by Bulmer-Thomas, the author identifies the activities that have the greatest forward and backward linkages to employment generation using an interindustry input-output model, also referencing work by Diamond, in which 36 sectors were ranked according to the value of their forward and backward linkages.[48] In the Diamond study, the more industrialized sectors performed the worst in terms of employment generation (forward linkage). Building construction and non-building construction are ranked in the middle of the activities studied. It is important to note that emergency shelter is not part of the modern construction sector that the author analyzed in his study. Where it is possible to use local, cheaper and simpler materials as well as employ unskilled or semi-skilled labor, both forward and backward employment generation would increase.[49] Figure 7 indicates the relationship between employment and unit value (cost, or price) of the product.

FIGURE 7. Employment Linkage Indices for Turkey (1967)

	Forward Linkages			Backward Linkages		
Employment Sector	**Z′ i**	**Rank**	**V′ i**	**Y′ j**	**Rank**	**V′j**
Agriculture	7.857	1	2.482	3.037	2	5.496
Forestry	1.788	4	3.684	1.294	6	4.870
Animal Husbandry, Fishing	3.893	2	3.654	3.609	1	4.300
Textiles	0.612	20	4.972	1.121	9	3.217
Wood Products	0.669	16	4.606	1.138	8	3.310
Non-building Construction	0.651	18	5.999	1.139	7	3.444
Building construction	0.652	17	5.999	0.936	15	4.147
Cement	0.439	25	5.091	0.663	28	3.387
Petroleum Refinery	0.057	36	2.399	0.207	36	1.877

Source: Diamond (1975) Cited in Bulmer- Thomas (1983)

[48] Bulmer -Thomas, V. *Input – Output Analysis in Developing Countries*, John Wiley & Sons Ltd., 1983

[49] Although we note that here, and in examples mentioned above where employment generation is identified as a goal, public policy should be formed with an understanding of the tradeoffs between worker quality and employment goals, and in particular cognizance of the fact that heavy emphasis on employment goals can work to the detriment of the overall economy. For an explanation and theoretical evidence, see "Fiscal Austerity and Public Servant Quality," by Nadeem ul Haque, Peter Montiel, and Stephen Sheppard, *Economic Inquiry,* 38, July 2000, 487-500. This argument is tied to discussion in this section on improving quality of skill application through training.

Suggested forward and backward linkage impacts are also addressed in a 2001 review of shelter as a livelihood mechanism in both pre-disaster, such as mitigation, and post-disaster situations. Setchell suggests that shelter construction or improvement can be seen to cumulatively build six or more livelihoods or incomes: one livelihood is provided through shelter construction, two in the backward linkages, one in non-HBE forward linkages, and two in HBE activities.[50]

Finally, the role of training for low-income populations in developing countries as a means to improve levels of employment and levels of income is often mentioned in the literature, but with relatively little quantifiable supporting data. UNDRO points to two types of training that could be available: teaching new building methods and management of post-disaster housing programs.[51] Petronella Kigochle also supports the value of training in that it creates opportunities for construction workers to be employed after the rehabilitation process if the formal sector is encouraged to hire them.[52] Unfortunately, neither source provides data to support these contentions.

SUPPORT AND SERVICE SECTORS. Beyond the NAHB study, relatively little quantified evidence exists on the forward linking relationships between shelter construction and the growth of the service sector and other support sectors in developing economies. In modeling the economic impact of housing construction, the NAHB study takes into account direct forward linkages in support and service sectors, and finds them to be extremely significant. For example, the construction of 100 single family homes in an average city in the United States generates a ripple effect of US$156,000 in added income to eating and drinking places, US$139,000 in automobile repair and service and US$283,000 in business and professional services.[53] Once, again, however, the NAHB study serves as a limited reference due to the particular context in which it was conducted.

Nonetheless, there are a few authors who address these important linkages in the developing country context. In the study previously referenced, Rietveld shows that an important part of construction activity has been directed towards upgrading and enlarging existing housing, and that improvement programs often have a significant impact on private sector housing initiatives.[54] Rietveld found that for every Rp 1 million invested in infrastructure, home owners invested another Rp 1.8 million in housing extensions and improvements, suggesting that home improvement could cause the demand for construction materials to increase, start-

[50] Setchell, 2001.

[51] An interesting differentiation is made between development and relief organizations. Apparently, the former will have ongoing programs in the country and could therefore reallocate the trained personnel in other programs. Office of the United Nations Disaster Relief Coordinator, *Shelter After Disaster*, New York, 1982.

[52] Kigochle 2001.

[53] NAHB p. 3.

[54] Rietveld, 1992.

ing a new circle of forward linkages. However, Strassman showed that dwelling expansion and improvement depended on total household income. According to his findings in Lima, it was owner-occupants of dwellings in conventional neighborhoods that improved their houses the most.[55]

The provision and maintenance of service infrastructure and maintenance can also have a real, positive impact on employment. According to UNCHS and ILO the construction of five-meter wide earth roads in rural areas can generate 2,000 work-days per kilometer, using labor-intensive methods.[56] Considerable potential for employment also lies in the waste management arena. UNCHS indicates that city authorities in developing countries spend 30 to 50% of their budgets on solid waste management. However, these appropriations typically only address the needs of more formal settlements.[57]

Two studies examine the relationship between HBEs and the demand for shelter related service. Mehta and Mehta and Strassman show that households that operate an HBE in a poor neighborhood are not only more likely to have a sewage system, but will have a higher resale value.[58, 59] According to the UNCHS, premises with HBEs are also more likely to have piped water and electricity, thus contributing to the owner's better health and higher productivity, as well as the economic impact in shelter construction.[60]

Forward Linkages: Economic Growth

In all economies, shelter constitutes a very significant asset, and for most households is by far the largest single component of their wealth. For a household to have access to shelter, and the potential to invest in, improve, and ultimately sell that shelter is an important mechanism for savings and investment in the economy. This is particularly true in developing economies, where poor access to capital markets and poorly developed or regulated savings and investment institutions make it difficult for households with limited incomes to save and invest.

MEASUREMENT OF SHELTER IMPACT ON REGIONAL OR NATIONAL GROWTH The intuition behind measurement of shelter impact based upon a macroeconomic perspective derives from an understanding of the structure of the aggregate economy. This understanding can be embedded in a very complex model and set of equations, but the basic intuition is straightforward. The total income available to the economy is divided among four possible types of expenditure: household con-

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[55] Strassman, P. "Types of Neighborhood and Home-Based Enterprises: Evidence from Lima, Peru." *Urban Studies.* 1986. pg 497.

[56] Ibid. p72.

[57] UNCHS, 1989.

[58] Strassman, 1986, p. 496.

[59] Mehta and Mehta 1990; Strassman 1986, p. 496,

[60] United Nations: *Housing and Economic Adjustment*. Taylor & Francis, New York, 1988.

sumption, investment in capital and other durable assets, government expenditures, and net exports. Household consumption, in turn, is often assumed to be proportional to total national income, determined by the marginal propensity to consume. A model for determining the multiplier for shelter investment might show, for example, that if 75% of national income is spent on household consumption, leaving 25% for investment, government expenditures and net exports, then the multiplier would be four and we would expect an externally generated increase in investment by providing replacement shelter in an emergency to increase national income by four times the value of the intervention.[61]

There are several difficulties with this perspective. First is the question of whether it is appropriate to view shelter intervention in this way. One objection might be that shelter is really a form of household consumption rather than investment, and with any multiplier effect to be much less than the equivalent amount of direct investment, whether from foreign or domestic sources.

Another possible objection might be concern that this perspective neglects part of what is essential about the nature of housing in generating an impact on the economy, and that the multiplier associated with such an important good must be much larger than would be expected from this simple model. This might be argued to be particularly true in an emergency situation, where failure to provide the shelter implies much more than living in housing that is less than ideal. Finally, we might accept the modeling, but observe that the limited data available to us on the structure of national economies makes it very difficult to obtain reliable estimates of the magnitude of the variables involved.

These concerns might be addressed in several ways. First, it is clear that the durability of housing, and the extent to which production takes place within the home in many developing country contexts, suggests that housing is appropriately viewed as a type of investment. Indeed, the literature suggests that this is the case (see following section - *Importance of Shelter as Capital*)

The second objection is more difficult to dismiss immediately. Housing is in many ways a special type of good. Not only does it typically absorb 25 to 40 percent of household expenditures, but its central role in providing protection from the elements, in promoting human health and hence productivity, and determining the structure of human social interaction suggests that it may play a fundamentally different role in the economy than other types of investment like farm machinery or manufacturing equipment.[62] While this is possible, it is unlikely that we can resolve the question using theoretical arguments alone. While several ideas or formal models are suggestive, in the end it is an empirical question: what is the impact on national income, or employment, of an intervention in the housing market?

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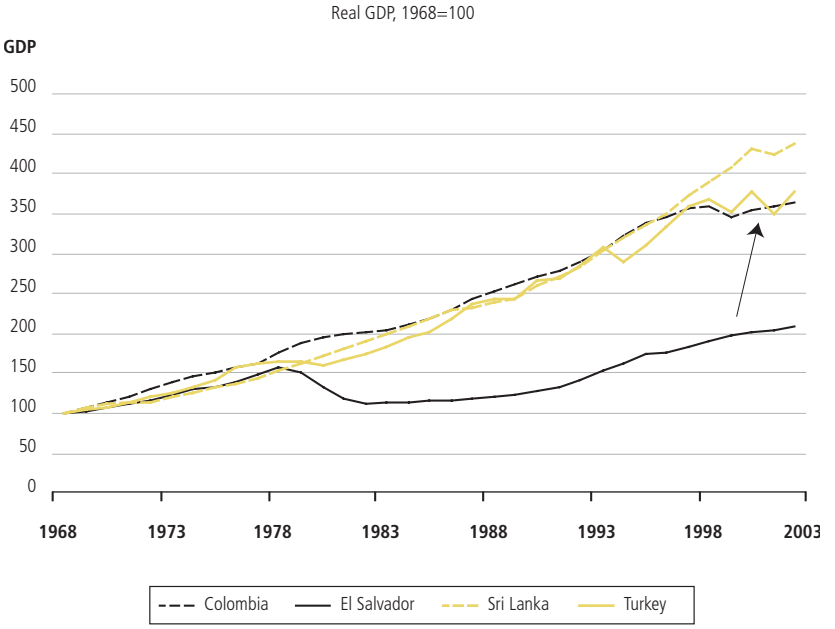
[61] Econometric explanation of this relationship is found in Appendix D.

[62] See discussion of Wen, Y. *Residential investment and Economic Growth* later in this report.

This brings us to the concerns of the final point: the availability and quality of data. In all but a few developed economies, there are no reliable data measuring the total output and income of the economy on the local level.[63] In developing economies there are also concerns raised about the data provided on the national level. In general there is data available on the total national output, the level of government expenditures, net exports, and aggregate investment for most countries. These data are available from the World Bank, and an example is illustrated in the figure below. The chart illustrates real, GDP in four countries: Colombia, El Salvador, Sri Lanka and Turkey, adjusted for inflation. The data have been scaled relative to the year 1968.



One potential method for measuring the impact of provision of emergency shelter would be to obtain an estimated based on data of this sort. For example, the impact of the 1999 earthquake in Turkey is clearly visible (marked by the arrow). GDP fell by nearly 5% from 1998 to 1999, and then rose by 7.4% from 1999 to 2000. This was certainly due in part to the devastation and economic disruption of the earthquake, and the prompt recovery partly due to the intervention of the international aid community. Of course, the recovery may be in part due to other factors: for example, a fall in imports or rise in government expenditures.[64]

[63] Two studies in the US that modeled impact on local economic growth are examined in the section above that discussed backward linkages.

[64] See also Beatley, Timothy; Berke, Philip: After the Hurricane: *Linking Recovery to Sustainable Development in the Carribean.* Johns Hopkins: Baltimore, 1997; as well as Albala-Bertrand *The Political Economy of Large Natural Disasters*, Clarendon Press, Oxford, 1993. Both authors document very similar behavior in the GNP of nations after disasters.

By using data from several countries that have experienced significant disasters involving populations left homeless, combining data on national income, government expenditures, net exports, foreign direct investment, housing assistance expenditures and housing destroyed, shown as persons rendered homeless by disaster, a multiplier for investment to output for the regional or national economy could be developed.[65]

IMPORTANCE OF SHELTER AS CAPITAL. There has been considerable discussion on the role of construction as a driver of economic growth, builder of confidence in the market, and creator of a key source of inflation-resistant capital (playing a critical role in development of wealth and investment capital), particularly in developed economies. Recent analysis of this relationship in developed countries indicates the primacy of shelter construction in causing growth in GDP, contradicting earlier conventional wisdom that capital formation in the form of business equipment determines the rate of a country's economic growth. A 2001 study by Wen showed that housing caused GDP growth, which in turn caused capital formation in the business sector, plant and equipment.[66]

The most forceful argument for better functioning capital markets for poor populations in developing countries is provided by Hernando de Soto. De Soto argues that the ability to build and use capital as a tool for increasing income is the single most important and single least enabled dynamic in the palette of programs for addressing poverty.[67]

The considerable data assembled and analyzed on HBEs points clearly to the importance of shelter as an economic tool and economic capital, and de Soto's analysis also supports the conclusion that "the major stumbling block that keeps the rest of the world from benefiting from capitalism is its inability to produce capital."[68] His work has established the validity and vitality of an informal extra-legal network that supports the extensive use of capital for entrepreneurial purposes in informal settlements where ownership is not secured by the national legal structure, but which nevertheless supports informal economies that equal or surpass the formal wealth in the countries' economy.[69] In these situations, capital remains

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[65] See Appendix D for discussion of the refined econometric model that could be used to address this.

[66] Wen, Y. "Residential investment and Economic Growth," *Annals of Economics and Finance.* November 2001; 2(2): 437-44.

[67] de Soto, H. *The Other Path: the Invisible Revolution in the Third World*, Harper and Row (1989). See also *The Mystery of Capital: Why Capital Triumphs in the West and Fails Everywhere Else.* Basic Books, 2000.

[68] de Soto, H. *The Mystery of Capital*, Basic Books, 2000.

[69] Statistics on the value of the informally owned property is impressive – in Haiti four times the value of all legally owned companies there and 158 times the values of all foreign investment; in Philippines it is four times the capitalization of the 216 companies on the Philippines stock exchange; in Egypt 30 times the value of all shares on the Egyptian stock exchange. In de Soto, H. *The Mystery of Capital*, Basic Books, 2000.

important and is utilized through social contracts that are, in effect, common law. DeSoto holds that these extra-legal networks only work so far and create situations where the energy of informal economic actors is undercapitalized and undermines the validity of the legal system – with consequent negative social and economic repercussions.[70]

Impacts of Emergency Shelter: Complex Emergency vs. Natural Disaster

In designing an intervention, program designers must weigh the demonstrated employment benefits of backward linkages with the potential returns of the forward linkages that will result from faster, more capital intensive strategies. This difference is most readily apparent when comparing the different strategies necessary to respond to complex emergencies, versus natural disasters.[71] Normally, complex emergencies will require the employment and multiplier benefits of strong backward linkages, whereas during sudden natural disasters, the forward linkages associated with return to preexisting market structures and employment may necessitate faster construction techniques with smaller backward linkages.

Following a complex emergency, societal economic structures have often been significantly disrupted, or in many cases no longer exist as a result of years of conflict or displacement. In comparison, natural disasters represent a "shock" to the local economy and society, but do not normally cause a complete breakdown of either. The impacts of natural disaster are more likely to occur in "pockets," with some sectors and locations remaining intact, while others are disrupted. For example, an earthquake might have a significant impact on local industrial production yet have very little effect on agricultural production, or vice versa in the case of a hurricane. Just as importantly, the society's overall indigenous structures, both social and economic, will remain intact following a quick onset and short-term natural disaster. These structures can include trade groups, business associations, church groups, regulatory authorities, and economic relationships with suppliers and markets. In contrast, a complex emergency will often exhibit a total breakdown of most of these structures. Years of war, conflict, or displacement may completely destroy particular industries.

As a result of these significant differences, a shelter program should account for the difference in socio-economic infrastructure in order to maximize economic

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[70] Most economists would also assert that without legal "ownership," economies can not get a critical or efficient amount of capital to approach their true potential for development. In addition, extra-legal relationships to release capital are often tied to criminal relationships. De Soto cites the repercussions on social order in extra-legal economies that are found in societies like Peru and most of the former Soviet Union.

[71] For a complete discussion of the differences between complex and natural disasters see Albala-Bertrand. "Responses to Complex Humanitarian Emergencies and Natural Disasters: an Analytical Comparison," in *Third World Quarterly* and Albala-Bertrand, *The Political Economy of Large Natural Disasters.*

benefit. For example, in responding to the earthquake in El-Salvador in 2001, CHF International utilized an "Emergency Transitional Shelter" (ETS) that was relatively capital intensive (imported plastic sheeting) and could be constructed in 4-6 hours. The backward linkages of the construction of these units therefore were minimal. However, there were significant positive economic impacts that resulted from forward linkages and the ability of the population to return to work as opposed to searching for shelter and/or waiting for a more backward-linkage intensive but much slower reconstruction effort (see analysis of the economic impacts of this program below).

In some cases, both forward and backward linkages can be addressed in the same program. An emergency shelter program that CHF International implemented in Sri Lanka for displaced people in 2003-2004 utilized more labor intensive technologies (see analysis under *The Impact of Shelter Provision on Household Welfare* below). The shelter units, while designed as "transitional" (core components could be broken down and reconstructed in the household's future permanent location), utilized labor intensive technologies such as clay bricks and wooden frames. The program provided vocational training to young men and women working on the shelter units. Also, the program assisted in the creation of local brick making facilities that stimulated further growth in the construction sector. Similar effects were seen in Kosovo following a CHF International winterization program in 1998. In Kosovo, the utilization of local materials and labor helped create business associations and spur growth in the local construction sector which had been previously destroyed by years of conflict.

The Impact of Shelter Provision on Household Welfare

Many of the studies cited above lack direct empirical evidence of the economic impacts of emergency shelter provision. Others have empirical evidence drawn from economic situations that differ in significant ways from the context of an emergency to a systemically underdeveloped situation.

This is problematic for assessing both forward and backward linkages associated with shelter provision, but is particularly problematic in assessing forward linkages. The studies cited above suggest that the combined impact of backward linkages, for example, growth in local economic activity resulting from the construction of housing and purchase of inputs for construction, is likely to be relatively modest in the context of small- to medium-sized communities in developing countries. As noted above, the NAHB model developed for application in the context of typical U.S. metropolitan areas suggests that between 65% and 85% of expenditures for house construction accrue as an increase in local income during the first year. It is likely that much of the impact of backward linkages would be manifest during this period. While emphasis on the use of local inputs and labor can help generate as large an impact as possible on the local economy, the small size of many settlements where emergency housing must be provided implies that it is likely that the aggregate increase in local incomes will be considerably less than construction costs.

The general impact of housing provision on the economy via forward linkages, however, is a different story. The source of such an impact has been discussed, and includes *inter alia* the improved health and productivity of employed members of the household. The shelter as a productive input to be used as part of an HBE is also a significant factor. Increases in local income from the sale of goods and services, whether of a durable nature for use in the home or of a non-durable nature for consumption, to local households whose purchasing power and economic functionality is enhanced due to the provision of shelter.

The flow of these benefits may be quite persistent, lasting even after the basic components of the initial emergency shelter have been disassembled, moved, or incorporated into some new structure. The initial increase in worker productivity may provide the opportunity for the workers in the household to gain early employment and early reintegration into the local economy. This translates into an increase in earnings potential that may last for the remainder of their working lives. In providing physical capital inputs for the establishment of an HBE, the shelter might provide the household with an advantaged position to become established in an emerging marketplace, and this improved competitive position for the household's business enterprise may provide returns that last for years.

Assessing the precise magnitude of these types of impacts is difficult, however, because data are scarce and rarely collected in a way that permits comparison and evaluation of the impacts of emergency shelter provision. While there are many variables that could be measured to provide an indication of the benefits derived from shelter, a reasonable starting point is to examine the impact on household earnings.

When assessing information, two features are critical: first, the data must include information on incomes before and after the emergency that has necessitated the provision of shelter. Second, the data must include information both on households that received shelter assistance and households that have not. This data is required because over the time period spanning the emergency, household incomes in the community are diverse and changing, with some increasing and some decreasing.[72] If housing assistance is effective in generating benefits for households who receive it, then those households should exhibit larger increases in income or smaller decreases in income over the time period when compared with households that did not receive emergency shelter assistance.

In addition to these basic data, it is desirable to collect information concerning basic household characteristics that could affect the income earning capacity of the household or the likelihood that the household is identified for receipt of

[72] It might seem that in a disaster or emergency setting household incomes would in general be falling but, as noted above, Albala-Bertrand has comprehensively documented in *The Political Economy of Large Natural Disasters* (1993, Clarendon Press, Oxford), natural disasters are often associated with increases in national income due to the increased effort and expenditures involved in coping with the emergency.

emergency shelter. Consider, for example, if households with young children are systematically favored in the allocation of resources for emergency shelter. If the presence of young children also limits the household's ability to take advantage of work opportunities that arise due to increased access to shelter, then data analysis might underestimate the impact of shelter provision on income because the ability of the shelter to enhance earnings is being limited by the competing goal of the aid agency to provide shelter to households with children. These interactions can be partially corrected for using statistical analysis if the data are available.

For this study, CHF International has conducted household surveys at three sites where some form of emergency shelter was provided to households during the past three years. The sites studied are in Sri Lanka, El Salvador, and Colombia, and are all locations where CHF International was involved in the administration and provision of shelter assistance. Interviews were conducted in the field during the time period of February through April of 2004. The surveys varied slightly among locations, but all followed the basic structure of the Sri Lanka survey that is reproduced in Appendix C.

Field administrators were asked to randomly select at least 150 households, in which at least 100 of whom were recipients of shelter assistance and 50 of whom did not receive shelter assistance. As seen in the survey, information was collected on the demographic structure of each family, household earnings from various sources before and after the emergency, household assets for consumption and for earning income, and other relevant variables.

For the data samples collected in each country, two models were estimated. One was a simple linear model that relates the percentage increase in household income to shelter assistance, household size, the age of the head of household, and an assessment of household vulnerability.

$$\frac{Y_{after} - Y_{before}}{Y_{before}} = \beta_0 + \beta_1 \bullet \text{Aid Recipient} + \beta_2 \bullet \text{PersonsInHousehold} + \beta_3 \bullet \text{AgeOfHeadOfHousehold} + \beta_4 \bullet \text{Vulnerable}$$

(Equation 1)

This model results in estimates of the parameter, which indicates the additional percentage increase in income associated with receipt of emergency shelter.

Often relations of this sort are not linear in nature, and in such cases it is helpful to explore alternative functional forms. One type of relationship that is useful relates the logarithm of the increase in income to the dichotomous variables (like shelter and vulnerability status) and the logarithm of other variables (like household size or age of the head of the household). Since some households experience a decline in income during the period, a "base" is added to all changes in

income, so that essentially the dependent variable is the logarithm of the amount by which the household's income increased above and beyond the income fluctuations experienced by the most disadvantaged households. The model estimated is given by the equation 1.2 below.

$$\ln (Y_{after} - Y_{before} + base) = \beta_0 + \beta_1 \cdot \text{AidRecipient} + \beta_2 \cdot \ln(\text{PersonsInHousehold}) + \beta_3 \cdot \ln(\text{AgeOfHeadOfHousehold}) + \beta_4 \cdot \text{Vulnerable}$$

(Equation 1.2)

Being non-linear, the calculation of the increase in income attributable to receipt of emergency shelter is more complex, and depends in particular on the values of the other variables included in the model. Comparing values of equation 1.2 when shelter aid status is alternatively set to 0 (no assistance) and 1 (receives assistance) provides the formula for the increase in income associated with emergency shelter:

$$Y_{after} - Y_{before} = (e^{\beta_3} - 1) \cdot e^{\beta_0 + \beta_4 \cdot \text{Vulnerable}} \text{AgeOfHeadOfHousehold}^{\beta_3} \cdot \text{PersonsInHousehold}^{\beta_2}$$

(Equation 1.3)

In evaluations of the impacts on household income presented below, the sample mean values are used for vulnerability status, age of head of household and household size.

There are other variables that are available in the data and might be included in a modeling exercise such as this. The variables chosen for inclusion are selected on the basis of producing a consistent set of results across all three locations, and (at least in some cases) statistically significant results.

Changes in income in situations of severe dislocation are of course naturally subject to extreme variation. This "noisy" high-variance of household income variation, as expected, produces a relatively low proportion of the total variation explained by the models. In most estimates, however, the parameter β_1 associated with shelter assistance is statistically significant at levels generally used for such tests. In all cases, the parameter is correctly assigned.

Estimates for the logarithmic model 1.2, applied in each of the three countries, are presented in Appendix A, Figure A1. The estimates for the linear model 1.1 are presented in Appendix A Figure A2. The following sections present some descriptive statistics and calculate the income multipliers implied by each model.

El Salvador

In early 2001, two earthquakes struck El Salvador, destroying many houses and damaging many others. CHF International worked in response to provide a

variety of types of assistance, both direct and indirect, via NGOs in the country. In particular, CHF International was asked to construct over 9,000 shelters for emergency use by households. These shelters were constructed and occupied by households during 2001, and our sample of recipients first occupied their shelters between February and October of that year. The sample was identified and interviewed in March of 2004, so as much as three years had elapsed between first receipt of the shelter and the administration of the survey. This affords an opportunity to observe a local economy in which considerable time has passed since the aid was given, and therefore provides a reasonable test of the persistence of the income benefits of housing assistance.

Figure 8 presents the average overall weekly income of shelter recipients before and after the earthquake (February-March 2004). During this time period, El Salvador was in the process of adopting the U.S. dollar as the official currency, and all incomes have been converted where required and are reported in dollars.

FIGURE 8. Income and Assets of Shelter Recipients in El Salvador

	Local Currency PPP USD 1			
	Weekly Income		Annual Income	
Recipients	**Before**	**After**	**Before**	**After**
Wages	33.57	46.37	1745.52	2411.20
Other Sources	44.24	50.00	2300.27	2599.84
Total	77.80	96.37	4045.79	5011.04
Assets of Recipients				
Household	298.64	444.76	298.64	444.76
Income	187.60	349.74	187.60	349.74
Total	486.24	794.49	486.24	794.49

Clearly, there is an increase in recipient income over the time period. These changes are due to a variety of factors. We use the models estimated for income change to isolate the portion of change in household income that is attributable to the receipt of shelter assistance.

The "multiplier" associated with emergency shelter provision is calculated by adjusting values of income before the disaster at the time of the survey.[73] Figure 9 shows these multipliers.

[73] An increase in household income is a flow that occurs over time, and the investment in emergency shelter is a change in the stock of capital available to the household. To compare the two, one must convert the flow into a present value to compare with the cost of the shelter. Two possible discount rates for calculating the present value of the income flow are considered: 5 percent and 10 percent. Each results in different levels of the multiplier. In addition, multipliers are calculated using both the logarithmic model and the linear model. Finally, the average of the multipliers calculated using each model is presented as a reasonable "central value" that might be taken as an estimate of the income multiplier associated with emergency shelter provision. The results of the calculations are presented in Figure 9.

FIGURE 9. Multiplier Calculations for El Salvador

Income Multiplier	Annual Income Increase	Multiplier	Multiplier
Cost of shelter $600.00		r=0.1	r=0.05
Log Model	$525.54	8.7589	17.5178
Linear Model	$222.40	3.7067	7.4133
Mid-range estimate	6.2328	12.4656	

The calculations indicate that with a discount rate of 10%, long run multipliers are on the order of 3.7 to 8.7, with 6.2 a reasonable mid-range estimate. Put in straightforward terms, an investment of US$1 million in the provision of emergency shelter results in increased income flows that are equivalent to an immediate payback of US$6.2 million. If we are willing to value future income flows more highly and use a discount rate of 5%, the multiplier doubles.

These calculations are encouraging for investment in shelter assistance. First, they indicate that the returns to such assistance are economically significant. Second, they are derived from data collected three years after the initial assistance was provided. The long time lag is likely to be the explanation for the imprecision of the model estimates which, though correctly signed, are not statistically significant at levels generally used. Our confidence in these values may be enhanced by comparison with those derived from the other settings.

Colombia

Colombia continues to be affected by internal conflict and forcible expulsion of households from particular areas. In the second half of 2002 and the first half of 2003 the number of persons forced from their homes and communities reached a level not seen in more than 15 years. More than 400,000 persons are estimated to have been affected, having once resided in over 900 different communities. CHF International has been involved in providing a range of relief services, including provision of temporary shelters made available to 2,671 families. These families occupied their shelters beginning at times ranging from May 2002 to March 2004.

A sample of these households and also of households in the regions who have not received shelter assistance was identified and were interviewed. Figure 10 presents a summary of average levels of income, earnings before and after the dislocation. The value of household assets at present (after the dislocation) is also presented.

FIGURE 10. Income and Assets of Shelter Recipients in Colombia

	Local Currency PPP USD 0.001197			
	Income of Recipients		Annual HH Income	
	Before	After	Before	After
Wages	64529.55	84354.61	4017.23	5251.42
Other Sources	116262.41	85588.65	7237.81	5328.25
Total	180791.96	169943.26	11255.04	10579.67
	Assets of Recipients			
Household	NA	167757.45	NA	200.84
Income	NA	17730.50	NA	21.23
Total	NA	185487.94	NA	222.07

The estimated models presented in Figures 8 and 9 above indicate that the impact of receiving shelter assistance has a statistically significant impact on change in household income. This is true whether we use the logarithmic model or the linear model. Figure 11 below presents the multiplier values that are implied by these estimates. Documents summarizing program activities suggest that the expenditure per shelter constructed was considerably higher than in the other two locations. This does not, however, seem to have reduced the payoff. The implied multipliers are even larger than those calculated for El Salvador.

FIGURE 11. Multiplier Calculations for Colombia

Income Multiplier	Annual Income		
	Increase	Multiplier	Multiplier
Cost in $ of shelter $3,043.00	r=0.1	r=0.05	
Log Model	$5,218.60	17.1495	34.2990
Linear Model	$957.91	3.1479	6.2958
Mid-range estimate		10.1487	20.2974

Even with the range of occupation times for shelter recipients, the estimated model indicates a clear, statistically significant impact of shelter assistance on household income. This translates into multipliers that are surprisingly large, indicating that an investment of US$1 million in shelter assistance provides an increase in incomes in excess of US$10 million.

As with any estimation exercise, caution should always be used in interpretation of the analysis. Different model specifications will give different estimates. No models were found that performed significantly better than the one used. Nevertheless, these results are consistent with those estimated using data collected in El Salvador, and serve to increase confidence in the general magnitudes of estimated impacts.

Sri Lanka

The final example uses data collected from Sri Lanka, where CHF International provided shelter to a population displaced into the Jaffna district.[74] Most families were from elsewhere in northern Sri Lanka and expected to return to their areas of origin when security was established and when the Sri Lankan army permitted their return. The poorest of these households were aided in a program in which CHF provided shelter assistance to 532 households. The program began providing assistance in October of 2003. A range of shelter assistance was offered depending upon the family size and the presence of vulnerable persons in the family (as defined by UNHCR).

Because of the relatively recent provision of assistance (most households had been in their shelters for only a couple months at the time of the survey), this setting permits us to examine the early stages of economic impact of shelter assistance. We expect to see more modest impacts (a) because time has not permitted full manifestation of the forward linkage-based effects, (b) because the population was part of an economy that had severely restricted commercial interaction outside the district, and (c) because most of the population was preparing for economic activity up on their return to their areas of origin, and not expecting to build livelihoods in their current location.

Figure 12 below presents the average income levels before and after relocation, along with indicators of the average assets of households.

FIGURE 12. Income and Assets of Shelter Recipients in Sri Lanka

	Local Currency PPP USD 0.041096			
	Income of Recipients		**Annual HH Income**	
	Before	**After**	**Before**	**After**
Wages	606.50	686.75	1296.08	1467.57
Other Sources	6.50	41.83	13.89	89.39
Total	613.00	728.58	1309.97	1556.96
	Assets of Recipients			
Household	4017.80	2803.80	165.11	115.22
Income	62.25	1206.75	2.56	49.59
Total	4080.05	4010.55	167.67	164.82

The estimated models for Sri Lanka indicate positive impacts of housing assistance on household income for both models, with the shelter parameter from the logarithmic model being statistically significant. Figure 13 shows the calculated multipliers for housing assistance.

[74] The Jaffna District is the district furthest north in Sri Lanka. Jaffna town (in the district) is the largest town in the majority-Tamil northern area.

FIGURE 13. Multiplier Calculations for Sri Lanka

Income Multiplier	Annual Income Increase	Multiplier	Multiplier
MC in $ of shelter: $320.00		r=0.1	r=0.05
Log Model	$79.33	2.4792	4.9584
Linear Model	$25.57	0.7990	1.5980
Mid-range estimate		1.6391	3.2782

As expected, the multipliers in the Sri Lanka case are considerably smaller – about one-fifth the magnitude of those estimated in Colombia and El Salvador, where there was a 2-3 year lapse in time between provision of assistance and the survey. Nevertheless, the multipliers estimated from the logarithmic model are greater than one and even the conservative mid-range estimates suggest a US$1 million investment in emergency shelter assistance returns at least US$1.6 million in increased household income.

Comparing these results with those presented above suggests it is reasonable to expect an increase in the income impact of this assistance, although there are other potential explanations for the relatively modest multipliers estimated for the Sri Lanka project. The households that were the target of this program were among the poorest of the displaced persons, lacking human capital and other assets that might assist their return and integration into a recovering economy, and, as noted, operating in a constricted economy which had reduced incentives to begin economic lives in their current situation. Given these restrictions, a multiplier of 1.6 over a few months seems important. Careful monitoring and subsequent study of this population may be warranted to clarify this result.

Findings and Recommendations

This report presents a review of the range of studies concerning the economic impact of providing shelter in post-disaster situations. This impact is understood to derive from both backward and forward linkages. The former are generally better understood and more frequently modeled than the latter. The impacts resulting from backward linkages are likely to be enhanced by reliance upon locally produced and procured materials, and local labor for construction. Even with such strategies in place, the impacts themselves seem to be relatively modest at the local level, although potentially important to the national economy.

The impacts from forward linkages have been less comprehensively studied, but new understanding is beginning to emerge from a variety of sources. For example, recent research on the importance of home-based enterprises (HBEs) suggests that this source of income is enabled through the provision of shelter and is *the single most important income source for the populations most affected by disaster*.

This report has devised a data collection instrument capable of gathering the information required to produce empirical estimates of the overall returns from emergency shelter provision that can be attributed largely to forward linkages. The survey instrument has been applied in three different settings, and statistical models have been estimated to provide an understanding of the link between changes in household income and the provision of shelter assistance.

Calculations based on the survey conducted by CHF International as well as the evidence, analysis and data from the relevant literature to date suggest several findings:

1) Families provided with shelter post-disaster typically attain a significantly higher increase in income than those families who are not provided with shelter[75].
2) Investments in emergency shelter provision provide significant returns, generating a payback conservatively valued at three to eight times the value of the initial investment.
3) Even for the programs serving the poorest and most vulnerable, and given only a short time for benefits to emerge, shelter provision appears to return considerably more than the initial investment.
4) The benefits of shelter last beyond the emergency assistance period. These include positive affects on increased income and family health.
5) The benefits from shelter provision appear to be larger after a period of a year or two has passed to enable forward linkages in the economy – for example, the use of shelter as a platform for business, investments as a consequence of rent-saving, or inducements for a range of trades serving the investments in the home.
6) The role of shelter as capital is particularly important in accelerating development and increasing incomes, but is typically unappreciated, particularly among post-disaster program planners.
7) Beyond capital, but linked to it, the role of shelter as an overall platform for increasing incomes – with links to key ingredients for income improvement such as credit, training, agricultural support, small business development – is underappreciated as well.

[75] This finding is based on this study's analysis of data collected from three post-disaster shelter provision programs. Results are analyzed with an accepted multi-variant econometric model that adjusts results for a range of variables affecting income such as age, presence and number of children, etc.

Suggested Next Steps

As indicated, literature and recent data collection and analysis demonstrates the significance of shelter as an important – and underappreciated – means for economic recovery. Nevertheless, we still do not understand how important it is nor do we understand enough about some aspects that seem especially critical for planning the most effective interventions. Future research and analysis should focus on several important areas of investigation that will assist the international community:

COMPARISON OF ECONOMIC IMPACT. Comparison of the economic impact of shelter to other mechanisms meant to build incomes of beneficiaries and the strength of economic recovery post-disaster. The first steps in this comparison would be to analyze the impact of the most common post-disaster programs with economic recovery agendas: seed & tools cash-for-work, and food-for-work programs. The key issues will be:

a) the effect on income – immediate and over two-to-four years;
b) the effect of the program on household capitalization and support for income production platforms; and
c) the effect on local/regional economies – the role of the program in supporting economic growth and thus opportunities for building household incomes. Effect on income could be studied with methodology similar or identical to that used to study the same subject in this report.

STANDARDIZATION OF PROCESSES AND TOOLS. Standardization of the processes and tools for data collection on economic impacts of the delivery of post-disaster assistance. The survey that is attached to this report as Appendix C could serve as a departure point for this discussion.

THE RELATIONSHIP BETWEEN DISASTROUS EVENTS. The relationship between disastrous events, IDP and refugee movement, and urbanization, as well as the economic strategies of those affected by disaster as they congregate in camps or integrate into urban settings and urban economies.

THE ROLE OF CAPITAL. The role of capital in economic assistance to those affected by disaster. Associated with this is the role of ownership of the means of production, and the ways that poor populations (and particularly forced-migrant and transitional populations) cope with the many tenure issues that affect their ability to develop capital and entrepreneurial bases.

The issues suggested above are important due to a fact which has been highlighted insufficiently in the literature – that disasters almost always increase urbanization. This occurs broadly around three dynamics common to forced migration:

a) Migrants move to urban areas for safety - they are able to "hide" more easily in urban areas; garrisons stationed in urban areas provide protection in times of war; and practical protection is more likely as urban areas will typically have greater concentrations of international organizations capable of witnessing and reporting abuses.
b) Urban areas and their concentration of markets provide an economy that presents more opportunities than rural economies crippled by war or natural disaster.
c) Displaced camps are often near urban centers due to access to services and proximity to international organizations that are more likely to have offices and operations in larger urban areas. These camps often become significant suburban areas of the towns and cities to which they are attached.

As urbanization occurs the rural skills of the displaced are replaced by urban skills. This means economic activity that is more likely to require skills, tools, and a platform that allows for productive activity in a small area; economic activity that is more market-skill intensive than typical rural economic activity; and that access to land, although important, is no less important than acquisition of other types of capital. The dynamics of urban economic strategies would appear to highlight the role of shelter. When urbanization occurs as result of disaster, shelter would seem to increase in importance in family's strategy for economic recovery.

Appendix A

FIGURE A1. Impact of Housing Assistance on Income: Logarithmic Model

EL SALVADOR

Regression Statistics				
R Square	0.0267			
Adjusted R Square	0.0078			
Standard Error	0.5107			
Observations	210			
	Coefficients	**Standard Error**	**t Stat**	**P-value**
Intercept	6.3821	0.4788	13.3290	0.00
Recipient	0.0380	0.0804	0.4725	0.64
Persons in household	-0.1579	0.0835	-1.8905	0.06
Age of head of household	-0.1574	0.1145	-1.3743	0.17
Vulnerable	0.0565	0.0793	0.7120	0.48

COLOMBIA

Regression Statistics				
R Square	0.0341			
Adjusted R Square	0.0157			
Standard Error	0.9447			
Observations	215 (Exclude 7 outlier cases)			
	Coefficients	**Standard Error**	**t Stat**	**P-value**
Intercept	11.3203	0.7451	15.1932	0.00
Recipient	0.3063	0.1551	1.9751	0.05
Persons in household	-0.1264	0.1978	-0.6390	0.52
Age of head of household	0.3891	0.1944	2.0015	0.05
Displaced	-0.2777	0.1808	-1.5362	0.13

SRI LANKA

Regression Statistics				
R Square	0.0962			
Adjusted R Square	0.0713			
Standard Error	0.7085			
Observations	150			
	Coefficients	**Standard Error**	**t Stat**	**P-value**
Intercept	5.7453	0.9416	6.1014	0.00
Recipient	0.3030	0.1283	2.3627	0.02
Persons in household	-0.0726	0.1740	-0.4170	0.68
Age of head of household	-0.2480	0.2594	-0.9561	0.34
Vulnerable	-0.2985	0.1640	-1.8196	0.07

FIGURE A2. Impact of Housing Assistance on Income: Linear Model

EL SALVADOR

Regression Statistics				
R Square	0.0330			
Adjusted R Square	0.0141			
Standard Error	30.4194			
Observations	210			
	Coefficients	**Standard Error**	**t Stat**	**P-value**
Intercept	23.9349	10.4758	2.2848	0.02
Recipient	5.4971	4.7782	1.1504	0.25
Persons in household	-2.1657	1.3738	-1.5765	0.12
Age of head of household	-0.2207	0.1660	-1.3297	0.19
Vulnerable	6.5127	4.8034	1.3559	0.18

COLOMBIA

Regression Statistics				
R Square	0.0315			
Adjusted R Square	0.0137			
Standard Error	24.9188			
Observations	222			
	Coefficients	**Standard Error**	**t Stat**	**P-value**
Intercept	-0.4298	8.2435	-0.0521	0.96
Recipient	8.5109	4.0358	2.1089	0.04
Persons in household	-0.4496	1.1748	-0.3827	0.70
Age of head of household	0.0815	0.1322	0.6167	0.54
Displaced	1.1145	4.6982	0.2372	0.81

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Regression Statistics				
R Square	0.0655			
Adjusted R Square	0.0397			
Standard Error	13.7569			
Observations	150			
	Coefficients	**Standard Error**	**t Stat**	**P-value**
Intercept	17.0817	6.3739	2.6799	0.01
Recipient	1.9518	2.4885	0.7843	0.43
Persons in household	-0.5884	0.7877	-0.7470	0.46
Age of head of household	-0.3255	0.1284	-2.5360	0.01
Vulnerable	0.1848	3.2100	0.0576	0.95

Appendix B

Survey Methodology

The survey, which is in Appendix C, was designed and administered in three locations where CHF International interventions have taken place or are currently underway. These surveys strike a balance between cost of administration and coming as close as possible to the ideal data collection and experimental design outlined above. In particular, the surveys were designed to:

- Collect information on housing conditions, employment status, household earnings, and wealth for a sample of households in the group that was affected by a disaster (V) and a subset of this group, and those that received shelter assistance (A). Households were asked to self-report amounts for these variables at present and for a specific point in time in the past, but prior to the disaster that affected them.
- Collect identical information from a group of households who have neither received aid nor been directly affected by the disaster, in order to provide baseline data.
- Collect information on size, age, and composition of households in order to assess the departures from "random assignment" into the groups V and A described above.

While the sample sizes are not immense, each survey sampled a minimum of 150 responses in each of several areas where interventions have occurred, with the expectation that these will provide sufficient data for obtaining an estimate.

The concern and emphasis on "random assignment" may seem puzzling at first, but is easily understood in light of two simple observations. First, households who become victims of the disaster might be distinguished in some ways. For example they may be lower income households who were forced to locate in areas that are at greater risk for natural disaster. If this is true, then some adjustment may be required both in estimating the impact of the disaster and in evaluating the impact of shelter assistance. Second, the households selected to receive assistance may be distinguished in some ways. For example, relief agencies may target scarce resources to those households perceived as most vulnerable, containing young children, for example. This may distort the observed impact of the assistance, and require correction in the estimation of impacts.

ESTIMATION OF IMPACT. Once the data are collected, the survey responses were used to calculate for each household the change in earnings ($\varnothing I$), change in wealth ($\varnothing W$) (measured by the values of their most valuable possessions) and change in employment status ($\varnothing E$). Each of these changes were modeled to determine

whether the household was affected by the disaster V, whether they received assistance A, and by household demographics (age of household head AH, number of children Ch, and indicator of household vulnerability Vi), presence of income from other sources OI, whether the household participated in construction of the shelter PC, housing quality HQ and size HS, and national economic conditions at the time (unemployment U and growth rate in per capita income PCI). We will begin by estimation of parameters in models of the form:

$$\varnothing I = \beta_0 + \beta_1 \cdot V + \beta_2 \cdot A + \beta_3 \cdot AH + \beta_4 \cdot Ch + \beta_5 \cdot Vi + \beta_6 \cdot Oi + \beta_7 \cdot PC + \beta_8 \cdot HQ + \beta_9 \cdot HS + \beta_{10} \cdot U + \beta_{11} \cdot PCI \quad (0.1)$$

This estimation provided direct measurement on the parameters β_1 and β_2, which will provide estimates of the impact of the disaster and the impact of the assistance. Models of this form will be estimated for wealth and employment status as well, with the exception that for employment status the estimated model will take into account the discrete nature of the variable.

Appendix C

Household Surveys

SURVEY FOR CHF SHELTER ASSISTANCE RECIPIENTS

HOUSEHOLD COMPOSITION. Mark appropriate box for each of up to seven persons in the household

		Persons in Household						
		A	**B**	**C**	**D**	**E**	**F**	**G**
1.	Relationship							
	Head of HH							
	Spouse							
	Son							
	Daughter							
	Mother/Father							
	Brother/Sister							
	Other							
2.	Gender							
	M							
	F							
3.	Age							
	Under 10							
	10-18							
	19-30							
	30-40							
	40-50							
	50-60							
	Over 60							
4.	Vulnerable Household? (circle one)	Yes	No					

INCOME. Enter appropriate amount for up to seven members of the household

For each member of your household identified at the beginning of the survey:	A	B	C	D	E	F	G
5. What is the current weekly income from wage earnings?							
6. What were the weekly wage earnings last August?							
7. What is the weekly income of these people from non-wage/private projects?							
8. What was the weekly income of these people from non-wage/independent projects last August?							

	Currently	Last August
9. List of private activities undertaken for income by persons in your household		
10. How much weekly income does your household receive from "remittances" (financial support from outside of the household, ie. family or friends)?		
11. Please list any other weekly income you may receive (military pension, government aid etc.).		

HOUSING INFORMATION. (CHF International Recipients)

12. Approximately what date was the CHF home completed?										
13. Were you involved in construction of the home? (circle one)	Yes	No								
14. Were you, or others in your household, paid to work on this home? If so, how much money was your household paid? (circle one)	Yes	No	Amount:							
15. How many days total did people in your household work (paid or unpaid) on construction of your home?										
16. Since the completion of the CHF unit, how many days have household members spent working on the home?										
17. How much money have you spent on the home since the completion of the CHF unit? (This includes furniture, utensils and any item primarily kept in the home)										
18. Rate the overall quality of your current home (10 being the highest)	1	2	3	4	5	6	7	8	9	10
19. Rate the quality of your home in August (10 being the highest)	1	2	3	4	5	6	7	8	9	10
20. Est. # of sq. meters in current home										
21. Est. # of sq meters of home in August										
22. Did you, or other members of your household, receive any training from CHF during the last 6 months? (circle one)	Yes	No								

ASSET INFORMATION. Please list items and provide estimated value or replacement cost

23. What are the five most expensive possessions of your household?

Owned Today		**Owned in August**	
Item	Est. Price	Item	Est. Price
1.		1.	
2.		2.	
3.		3.	
4.		4.	
5.		5.	

24. Please list five items in your home that help you earn money, starting with the most valuable (they can be the same as before, include livestock)

Owned Today		**Owned in August**	
Item	Est. Price	Item	Est. Price
1.		1.	
2.		2.	
3.		3.	
4.		4.	
5.		5.	

SURVEY FOR CHF SHELTER ASSISTANCE RECIPIENTS

HOUSEHOLD COMPOSITION. Mark appropriate box for each of up to seven persons in the household

		Persons in Household						
		A	**B**	**C**	**D**	**E**	**F**	**G**
1.	Relationship							
	Head of HH							
	Spouse							
	Son							
	Daughter							
	Other							
2.	Gender							
	M							
	F							
3.	Age							
	Under 10							
	10-18							
	19-30							
	30-40							
	40-50							
	50-60							
	Over 60							

INCOME. Enter appropriate amount for up to seven members of the household

For each member of your household identified at the beginning of the survey:	A	B	C	D	E	F	G
4. What is the current weekly income from wage earnings?							
5. What were the weekly wage earnings last August?							
6. What is the weekly income of these people from non-wage/private projects?							
7. What was the weekly income of these people from non-wage/independent projects last August?							

	Currently	Last August
8. List of private activities undertaken for income by persons in your household.		

HOUSING INFORMATION. (non-CHF Recipients)

9. Approximately what date did you move into your current house?										
10. Over the past six months, how many days have people in your household worked on improving/ constructing of your home?										
11. How much money has your household spent on your home or items for your home over the past six months? (This includes furniture, utensils and any item primarily kept in the home)										
12. Please rate the overall quality of your current home (10 being the highest)	1	2	3	4	5	6	7	8	9	10
13. Please rate the quality of your home/living conditions in August	1	2	3	4	5	6	7	8	9	10
14. Est. # of sq. meters in current home										
15. Est. # of sq meters of home in August										

ASSET INFORMATION. Please list items and provide estimated value or replacement cost

16. What are the five most expensive possessions of your household?

Owned Today		**Owned in August**	
Item	Est. Price	Item	Est. Price
1.		1.	
2.		2.	
3.		3.	
4.		4.	
5.		5.	

17. Please list five items in your home that help you earn money, starting with the most valuable (they can be the same as before, include livestock)

Owned Today		**Owned in August**	
Item	Est. Price	Item	Est. Price
1.		1.	
2.		2.	
3.		3.	
4.		4.	
5.		5.	

Appendix D

Macro Models for Measurement of Impact of Shelter on National Economies

The total income available to the economy is divided among four possible types of expenditure: household consumption C, investment in capital and other durable assets I, government expenditures G, and net exports X-M. Household consumption, in turn, is taken as proportional to total national income, determined by the marginal propensity to consume, m. These ideas can be represented in the equations familiar from any introduction to economics course:

$$\begin{aligned} Y &= C + I + G + X - M \\ C &= m \cdot Y \end{aligned} \qquad (0.2)$$

Combining these and solving for aggregate income yields:

$$\begin{aligned} Y &= m \cdot Y + I + G + X - M \\ Y(1-m) &= I + G + X - M \\ Y &= \frac{1}{1-m}(I + G + X - M) \end{aligned} \qquad (0.3)$$

This provides the simplest rationale for the idea of a "multiplier," in this case represented by the quantity $\frac{1}{1-m}$. If we regard adding to the local housing stock as a type of investment, then an externally generated increase in shelter provision is equivalent to an increase in I in the final line of (1.2). If the size (measured in local currency) of this shelter program is $\varnothing I$ then we can expect total income to increase by $\frac{\varnothing I}{1-m}$.

In this simple example, the quantity $\frac{1}{1-m}$ represents the combined multiplier effects from all sources. Thus if the 75% of national income is spent on household consumption, leaving 25% for investment, government expenditures and net exports, then the multiplier would be 4 and we would expect an externally generated increase in investment by providing replacement shelter in an emergency to increase national income by four times the value of the intervention.

A refined model can be obtained by combining data on national income (Y), government expenditures (G), net exports (XM), foreign direct investment (FDI), housing assistance expenditures (H) and housing destroyed (persons rendered

homeless by disaster) (D) the parameters could be estimated in the following equation:

$$Y = \beta_0 + \beta_1 \cdot H + \beta_2 \cdot D + \beta_3 \cdot FDI + \beta_4 \cdot G + \beta_5 \cdot XM$$

There would be some experimentation required to determine the best functional form and to test the specification, but the idea would be to use the estimated value of β_1 as an estimate of the multiplier associated with provision of housing assistance. This approach would require obtaining data on the magnitude of H in each of the countries used in the analysis. If such data can be obtained, this approach could provide a useful direct estimate of the benefits.

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