

## FINANCIAL IMPLICATIONS OF NATURAL DISASTERS: SOME PRELIMINARY INDICATIONS

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### INTRODUCTION

The financial impact of natural disasters on society has increased substantially in recent years. The havoc wrought by Tropical Storm Agnes in June, 1972 in the eastern United States, where damage to personal and business assets was a staggering \$ 2 billion, illustrates the problems faced by households and firms in their recovery efforts. As discussed in several sources (Kunreuther, 1973; Rawls and Stranahan, 1974) very few of the victims were covered by insurance so that most of them turned to the federal government for relief. The response was, as usually occurs when a response is made without prior planning, somewhat uncoordinated. For example, changes in the Small Business Administration (SBA) program were rushed through the United States Congress with little concern as to the long-run effects of these changes. Likewise, the state of Pennsylvania immediately instituted a grant program for flood victims. Some of these benefits were later taxed by the United States Internal Revenue Service. Furthermore, after a substantial number of homeowners had utilized their own resources and/or incurred additional debt in order to recover from Agnes, the Urban Renewal program began to purchase unrepaired homes at preflood market values substantially reducing the impact of the disaster on those homeowners while breeding resentment among

those that had begun the recovery effort on their own. Such results suggest that research into the financial effects of disasters and the associated recovery period might be appropriate.

### Previous Studies

The impact of mass emergencies on communities has been the subject of some analysis by disaster researchers. For example, Prince (1920) analyzed the long-run changes in Halifax, Canada, caused by a catastrophic explosion in that community. Studies on Hurricanes Audrey and Carla, and other American disasters in the 1950s to the mid-1960s also focused on organizational preparation in the community (see, for example, Bates et al., 1963; Moore et al., 1964; Taylor et al., 1970; Rosow, 1977). The role of the 1964 Alaskan earthquake in changing the sociological, organizational and economic characteristics of a community has been studied in detail and reported by the National Academy of Sciences (NAS) (1970). Similarly, much of the work at the Disaster Research Center of the Ohio State University centers on the roles of various community groups in disaster preparedness as well as the response of various organizations during the postdisaster and recovery periods (see Quarantelli and Dynes, 1970; Quarantelli, 1977). These studies suggest that disasters

might provide the stimulus for change which may otherwise take an exceptionally long time to accomplish.

While these and other studies examine disaster preparedness and the recovery process, many of the studies do not fully consider the economic consequences of the disaster. That does not mean that economics has been totally ignored. The NAS study of the Alaskan earthquake has reports by Rogers, Kunreuther and others on the economic impact of that disaster. Furthermore, work by Haas and Kates (1973) as well as current work by the Social and Demographic Research Institute (SDRI) of the University of Massachusetts under Rossi, by a group at Northwestern University under Friesma, and by other groups concerns the economic impact of some past disasters such as the Topeka tornadoes, the Yuba City floods, and the Seattle earthquake. These studies analyze the economic effects for an entire region with respect to employment, income, production, and other macroeconomic variables. The economic impact on a particular element of the community such as the household, has remained largely untreated, however. An exception is the study by Dacy and Kunreuther (1969) who looked into the economic implications of federal policies, prevalent in 1969, toward disaster victims, focusing primarily on households. Since that time, several changes in the disaster recovery programs have been made which are discussed by Kunreuther (1973). While these studies by Kunreuther as well as one by Cochrane (1975) consider the impact of various types of economic aid to victims such as insurance and SBA loans, detailed analyses of the impact on household financial characteristics are not available. The need for further studies in this area was underscored in a recent assessment of research needs by White and Haas (1975). Some recent work by Kunreuther et al. (1976) has begun the analysis of the economic impact on the household.

Yet for any victim of a disaster, this area is of prime concern. Of course, the financial char-

acteristics of households have been studied outside of a disaster context. Some data collection and analysis has been completed on the financial characteristics of households (see, for example Projector, 1968; Projector and Weiss, 1966; Friend and Blume, 1976; Dunkelberg and Stafford, 1971; and others). All of these deal with financial decision making under normal conditions. They enable one to study what types of funds a household utilizes for purchasing specific items. A disaster, however, is by definition a violent change from normal conditions (Barton, 1970). In that situation households have to acquire a substantial number of items at approximately the same time, generally in excess of the available resources.

As a result, several plans have been devised by the United States federal government to aid the financial recovery of the households. There have been no studies undertaken to determine whether these plans have provided the necessary funds needed by households, to what extent they are used, and what their effects have been.

Hence, a study is needed to examine the impact of disasters on the households and the postdisaster financial recovery path. The purpose of this paper is to present preliminary findings on these questions. A survey of a sample of disaster victims is described in the next section; a preliminary analysis of the survey data follows. The final section presents conclusions and recommendations.

#### **FIELD SURVEY ACTIVITIES**

To determine the financial impact of a disaster, it was necessary to obtain information on the values of the various asset and liability accounts from the victims of a disaster. Projector (1968) and Projector and Weiss (1966) showed it was possible to obtain this information from individuals by interviewing households in a nationwide survey. Although they demonstrated the feasibility of such a survey, specific data on changes in financial position caused by a disaster are not available.

### Sample Selection

To obtain this information, households in a community which suffered a disaster had to be interviewed. Such a community is the Wilkes-Barre/Wyoming Valley area of Northeastern Pennsylvania, the heart of which is Luzerne County. In June, 1972, the area was devastated by flooding of the Susquehanna River caused by Tropical Storm Agnes (for different accounts of the disaster see Mussari, 1974; Blanshan, 1975; Cohen, 1976; Heffron, 1977). It appeared that such a community would be useful for obtaining the information needed to study the financial impact of at least natural disasters [1].

Using census tract information and an outline of the flood area obtained from the Luzerne County Planning Commission, the population of flood victims was identified. Based on the 1970 census information, this area included 23,455 households. These households were grouped by census tracts and a random selection of these tracts was made by household density. The tracts chosen as part of the sample were then completely enumerated. The final sample was then chosen randomly from the enumeration. This procedure insured obtaining a random sample such that the results of the sample would closely approximate that of the population.

### Questionnaire Construction

Before constructing a questionnaire, it was necessary to determine how the information would be organized so as to assure that relevant data were obtained. While a uniform format has not been developed for households, a systematic way to present financial information has been developed by constructing balance sheets similar to those utilized for the analysis of business firms [2].

During the spring of 1974 a questionnaire was constructed after referring to other questionnaires used for financial and disaster re-

search such as the Projector and Weiss (1966) and Kunreuther et al. (1976) studies. The preliminary questionnaire was tested by face-to-face interviews of households in Wilkes-Barre to determine any problems with responses or any information omitted. Based on these interviews the final form of the questionnaire was developed which was again pretested to assure its completeness.

The final version of the questionnaire was designed to provide the following information:

- a A section concerning the impact of the disaster on employment. While not directly used in the construction of financial statements, it does provide information on changes in the employment patterns of the victims and the amount of time needed for the household to regain its income from employment.
- b A section describing housing, autos, and personal possessions in physical and financial terms; that is, in terms of physical characteristics as well as cost and market values. The data obtained for these items are before the flood, immediately after the flood, and two years later.
- c A series of questions on housing before the flood and the financing of that housing. Housing patterns after the flood are studied as well as questions on current housing. In-depth questioning concerning the role of the SBA and bankruptcy in the recovery process is also included.
- d These sections are then followed by questions concerning the status of various asset and liability accounts. Again the information obtained is prior to the flood, after the flood and two years later. The balance sheet for each household is developed from this section.
- e Finally, a series of questions on the demographic and socioeconomic characteristics of the respondents is asked.

The survey was conducted in July and August, 1974, by face-to-face interviews with respondents.

### Survey Response Experience

The response experience of the survey is summarized in Table I. Several features of the response pattern should be noted. It was the objective of this survey to interview the residents of the chosen household who had been living there in June, 1972. With respect to renters, this proved quite difficult. First, the owner of the property had to be determined from tax assessment records. After contacting the owner for the name of the tenant(s) who

resided at the property at the time of the flood telephone, state grant, Red Cross, Housing and Urban Development or other records were searched to find the present whereabouts of these renters. While considerable success was achieved, the location of 3% of these renters could not be determined. Neither former friends, landlords, nor neighbors knew where they were. They had not applied for any type of disaster relief either. Based on the sample population, more than seven hundred households just disappeared without a trace. While most of these victims probably just moved away, it is a surprising result. While it was beyond the scope of this study, it might be interesting to follow the migration patterns of these victims.

Another aspect of the response pattern involves those who were known to have left the area. Most were homeowners who had their homes acquired by the Luzerne County Redevelopment Authority in conjunction with Urban Renewal. These homeowners took the proceeds and moved at least fifty miles from the Wilkes-Barre/Wyoming Valley area. This being the case, the results obtained here are biased toward those who remained in the vicinity of the Wilkes-Barre area.

TABLE I

Characteristics of non-respondents

	Total	Percent of total sample
Total sample	200	100
Unable to locate	6	3.0
Moved from area *	10	5.0
Deceased	4	2.0
Vacant at time of flood	6	3.0
Incorrectly included in flood map	6	3.0
Not at home	78	39.0
Completed interviews	90	45.0

\* More than fifty miles from the Wilkes-Barre/Wyoming Valley area.

Finally, there was a large proportion of "not at home". Since the interviews were con-

ducted at a time when people tended to go on vacation or be involved with activities away from home, a much higher level of "not at home" was encountered than might be expected.

It should be emphasized that the nonrespondents tended to be scattered throughout the sample. There is little reason, therefore, to believe that any relevant bias has been introduced into the sample by nonrespondents.

The reliability and validity of the information provided by the respondents is of obvious concern. Several methods are available to check the reliability of survey data. Projector and Weiss (1966), for example, used independent sources for verification such as banks, brokers, etc. Such a process was far beyond the resources available for our study.

Another possibility is to reinterview respondents and check the similarity of the information provided both times. Such an exercise was also beyond the scope of the project here. Most respondents referred to documents containing the necessary information, however. It can be presumed, therefore, that measurement error is not excessively large which will tend to minimize the biases in subsequent analyses. Hence the data can be presumed to be reliable in general. Exceptions to this situation are noted where pertinent.

#### PRELIMINARY ANALYSES OF QUESTIONNAIRE DATA

While in-depth analysis of the survey data has not been completed, some preliminary results of the survey appear quite interesting.

#### Impact on Employment

The interesting result which comes from this section of the survey was that the flood did not have a large impact on employment because over one-quarter of the population was already unemployed before the flood. This high rate of unemployment was due to the high percentage of retirees in the popula-

tion (20%+) which is much higher than for the U.S. as a whole (retirees are classified here as being unemployed) and is also reflected in the above-average age of the community. Of those working, most described themselves as blue-collar or lower white-collar workers. Of these, a very high percentage (80%+) reported some damage to their work place from the flood. Those which reported flood damage to place of employment stated that two months was the median time of unemployment due to the flood. Significantly, less than 5% of the population had to change jobs due to the effects of the flood.

While the impact on employment here appeared in line with the results previously suggested by Cochrane (1975) and Haas and Kates (1973), it does suggest that the recovery process of the business community tends to be faster than for households. This is to be expected as the emphasis is generally on rehabilitating the businesses first so that the households can reestablish their flow of income.

#### **Asset Losses Experienced by the Community**

The survey then examined the effects of the flood on such physical assets as homes, personal possessions and automobiles. Information on such financial assets as savings was also gathered. Several startling results were obtained which are now reviewed.

Assuming that the sample reviewed here is representative of the population of the devastated area, it appears that damages for the area are grossly underestimated. Damages to structures and contents were reported in the local newspapers as approximately \$445 million for households in the Wilkes-Barre/Wyoming Valley area. It is not known how these estimates were derived but, using the data from the survey, it is estimated that the area suffered damages to *households alone* in excess of \$646 million or \$200 million more than estimated. Excluding public and business losses as well as psychological and sociological losses,

the magnitude of these damages ranks this event as one of the major disasters to hit an American community.

#### **Impact on Real Assets**

The impact on house values was considerable but apparently most owners had rebuilt two years later. Over 67% reported that their residence was heavily damaged. This result is borne out by reviewing the decline in house values due to the flood. Prior to the flood the average value of a home was \$21,000, while immediately after the flood the average value had declined to \$8,200 or an average loss of \$12,800 (each of these accounts is on the balance sheets shown in Table II). This loss is not necessarily the repair cost but may also include the unattractiveness of the area immediately after the flood. No attempt was made to determine if factors other than damages reduced market value. It is interesting to note that two years later the average value of a house had not only returned to pre-flood level but at \$27,000 was in fact higher. These results suggest that the victims had completed the recovery process and had returned to pre-flood conditions. In fact, 70% said their present housing (two years after the flood) was the same or better than their pre-flood housing. Such a conclusion would be hasty, however. Not only did 30% say their housing was worse than pre-flood but also it will be seen later that some fundamental changes in the financial condition of these households had taken place which were a function of the recovery process.

A more vivid picture of the flood's impact is seen when reviewing the changes experienced in home furnishings. Prior to the flood, the market value of the home furnishings in the average house was \$ 10,100. After the flood, these furnishings were valued at an average of \$900. Two years later, the household furnishings were valued at more than \$11,200. Similarly, personal property (such as silver,

TABLE II

## Comparative Household Balance Sheets for the Average Household

	Prior to flood	After flood before recovery	Two years later
<b>Assets</b>			
Cash & demand deposits	\$ 1,850	\$ 1,850	\$ 1,850
Securities	3,650	3,650	3,275
Savings accounts	5,300	5,300	5,500
Savings bonds	1,225	1,225	1,435
Cash value of life insurance	2,800	2,800	4,000
Financial assets:	\$ 14,825	\$ 14,825	\$ 16,060
Automobiles	1,900	1,600	2,200
Market value of home	21,000	8,200	27,000
Market value of contents	12,500	1,100	12,300
Real Assets:	\$ 35,400	\$ 10,900	\$ 41,500
Total Assets:	\$ 50,225	\$ 25,725	\$ 57,560
<b>Liabilities</b>			
Notes payable	\$ 330	\$ 330	\$ 490
Unsecured credit	70	70	115
Current Liabilities:	\$ 400	\$ 400	\$ 605
Bank Loans	600	600	550
Mortgages	3,600	3,600	1,100
SBA loans	0	0	12,700
Other loans	115	115	190
Long term debt:	\$ 4,315	\$ 4,315	\$ 14,540
Net worth: (equity)	\$ 45,510	\$ 21,010	\$ 42,415
Total liabilities & net worth:	\$ 50,225	\$ 25,725	\$ 57,560

furs, paintings, etc.) was valued at \$2,400 prior to the flood while after the flood it was valued at about \$200. Two years later, some recovery is noted to \$1,100 but it is still less than half of the preflood value. Again, such results suggest that, except for some personal property items, the victims had fully recovered from the disaster.

These results also demonstrate that the usual assumption made by casualty insurance companies that the value of home contents is half that of the structure grossly understates the actual values. The average home value of \$21,000 previously shown consists of both

land and structure value. The survey ascertained that the average land value prior to the flood was \$4,500, leaving \$16,500 for the structure. Taking half of the structure value for contents value, as casualty companies do, suggests a contents value of \$8,250. Furthermore, casualty companies include all personal property in this value while the survey value only included home furnishings and not personal property such as furs, silver, paintings, etc. Including personal property as well as home furnishings results in a preflood contents value of \$12,500. However, the values used here are all *market* values which are less than the *repla-*

*cement* costs used by the casualty insurance companies. If it is assumed that market value is 80% of replacement cost, the preflood replacement cost of the contents is \$15,625 or 95% of the structure value [3]. Besides suggesting that most households are underinsured, probably quite accurately, these results suggest that disaster aid programs which might be designed using casualty company assumptions will probably be inadequate [4].

The final physical asset account investigated involves automobiles. Prior to the flood, the market value of automobiles for the average household was slightly more than \$1,900 while after the flood it was slightly more than \$1,600. The \$300 difference suggests that while some households suffered damages to automobiles, most autos escaped damage. It is interesting to note that two years later the value had increased to \$2,200. Several reasons can be suggested for this phenomenon. It is possible that those who lost their automobiles in the flood replaced them with cars whose market value is greater than the preflood auto value either because the car is newer or is a more expensive model than the one lost. However, it may also be due to victims buying new cars even though they had not suffered damage to their automobiles. Preliminary analysis of the survey data shows that while only 20% of the households reported damage to automobiles, 52% purchased at least one new car after the flood. Although an examination of such social behavior is beyond the scope of this study, it might be a fruitful area for research to study why people were buying new cars while claiming to have insufficient funds for recovery.

#### **Impact on Financial Assets**

Now that the influence on physical assets has been examined, the impact on financial assets (such as savings, securities, etc.) can be reviewed. One characteristic of financial assets is that they cannot be destroyed by a disaster [5]. Thus, the value of these accounts after the

flood but before the recovery is the same as before the flood. Since these assets are easily converted to cash, they are available to meet recovery expenses. The question of interest is to what extent these financial assets change over the recovery period.

Prior to the flood, the average household had \$1,850 in cash and demand deposits. Two years after the flood, it was still \$1,850. Likewise, the average household had \$3,650 in marketable securities (stocks, bonds — except U.S. Savings Bonds —, etc.) while after the flood it was \$3,275, a net decrease. Since the stock market was somewhat lower in 1974 than in 1972, the decrease in value does not necessarily mean disposal of any securities but may merely reflect a reduction in their value.

Savings must also be reviewed. Prior to the flood the average household had \$5,300 in savings accounts while two years later it was \$5,500. In a similar fashion, such a household owned \$1,225 in savings bonds while two years later it owned \$1,435. These results show that there was no decline in the level of these assets and, in fact, there may have even been a slight increase.

Finally, life insurance is an asset which is convertible to cash. Prior to the flood the average family had \$2,800 in cash value while two years later that amount had risen to \$4,000. The reason for the increase is that disaster victims increased life insurance purchases after the disaster.

It can thus be seen that if the assets prior to the flood were totaled, the average household would have owned \$50,225 in financial and physical assets (see Table II). After the disaster, these assets had declined to \$25,725 or *a loss of \$24,500 per household*. Two years later, however, the value had increased to \$57,560. As previously stated, such observations have led to suggestions that the recovery process was virtually complete and that households had returned to their preflood status. However, there are two sides to the balance sheet. The impact of the disaster on liabilities must now be reviewed.

### Impact on Liabilities

Liabilities are divided in a manner similar to assets; those which mature very shortly (generally within one year) and those of longer length. Two types of liabilities are classified as current – unpaid credit purchases such as credit cards etc., and notes payable such as finance company loans. Prior to the flood the average household had \$70 in unpaid credit purchases and \$330 in notes due. Two years later, they had increased to \$115 and \$490 respectively. Thus, the short-term claims on the household had increased over the recovery period. There are several possible reasons for these increases. Funds which were used for the payment of bills before the flood may now be used for recovery expenses. For example, if households borrowed money from whatever source to repair damage, those loans must be repaid regularly out of current income. These payments reduce the amount available for other living expenses which means the amount of purchases made using credit must be increased; e.g., after the flood, the doctor may have to wait two months to get his bill paid instead of one month as before the flood. Another reason might be that some home furnishings were purchased using credit either before the SBA funds were released or because SBA funds had been depleted. While there is no way to know exactly what brought about these increases (and in fact it may be all, some, or none of the reasons given here) what is important is to note that such increases do occur.

Somewhat different results are seen when reviewing certain long-term debts. Prior to the flood, the average household had \$115 in non-bank loans and \$600 in bank loans. Two years later these had changed to \$190 and \$550 respectively. Such changes are by no means spectacular and do not necessarily indicate any fundamental changes.

The most startling results come when reviewing mortgages where real estate is the col-

lateral. Prior to the flood, the average household had \$3,600 in mortgage debt. Two years later, this had changed to \$1,100. Much of the reduction can be traced to the debt repayment feature of the SBA loan program [6]. However, prior to the flood no one had an SBA loan whereas two years later the average family had \$12,700 in SBA debt (not including the \$5,000 forgiveness grant feature). The \$5,000 grant (less taxes on that amount) was available to the household for any recovery purpose and was not to be repaid. Since there was no liability on the part of the household, assets were increased by \$5,000 (less taxes) with no corresponding increase in debt. Since total assets must equal total liabilities plus equity, the net worth component increased by that amount and can be viewed as a return by the government of some equity lost in the flood. Notwithstanding this return of equity, there is a significant increase in the amount of long-term indebtedness of the household.

### Analysis of the Preflood Ratios of the Household

Now that the components of the balance sheet have been examined, it is necessary to see how the financial characteristics have changed from the time before the flood to the time two years later. Adding up the components of the liability side prior to the flood, the average household had approximately \$4,715 in total debt. If total assets before the flood were \$50,225 this household had a net worth (equity) of \$ 45,510. Dealing in absolutes often leads to meaningless comparisons and erroneous conclusions, however, in that households with the same assets may have financed those assets quite differently. Ratios may provide a better comparison. For example, if the total asset of each household is divided by that household's total assets, the relative claims on assets by others could be compared across households. Likewise, ratios can be used to highlight changes in a household's balance sheet between two points in time (e.g., pre-

disaster vs. post-recovery). Ratios can be constructed to examine liquidity (financial assets in relation to total assets or to debts), claims (debt) on what the household owns (assets), and others. Constructing certain standard ratios shows that claims on assets by others (ratio of debt to total assets) was 9.5% and the ratio of debt to equity was 0.10 (see Table III for a summary of these ratios). The current ratio was 3.1 and the quick ratio was 2.4. These ratios mean that the average household could meet its total debts from financial assets (it had more than three times as much in financial assets than debts or more than twice as much in financial assets, excluding marketable securities, as needed to pay off all debts) and would not have to sell a home or other real asset to meet these debts. Finally, the average household preferred to keep 29.5% of total assets as financial assets. To determine whether these were unusual, one would have to compare these ratios with ratios developed for similar households [7]. These preflood ratios appear to be typical of a community with a high proportion of older households and households with a high variability of income. As stated previously, this was predominantly a blue-collar/lower white-collar community which typically suffers a high variability in income from frequent layoffs. Further, it is shown

later that this is indeed a much older community than the average U.S. population (the median age is fifty years)[8]. It is therefore assumed that these ratios are an adequate representation of the preflood levels of debt and financial assets of the community. For the purposes of this study, it is also assumed that these ratios indicate the preferred levels of debt and financial assets and the levels which the average household strove to attain after the flood.

#### Analysis of the Postflood Ratios of the Household

It is assumed that immediately following the flood, debts did not change but only total assets. At that time, net worth (equity) had declined to \$ 21,010 resulting in a debt to equity ratio of 0.22 and a debt constituting 18.3% of total assets, i.e. a sudden doubling of these quantities. While the current and quick ratios had not changed, the financial assets were then 57.6% of total assets due to the loss of real assets.

As previously discussed, it is shown that two years later the level of assets for this average household had not only returned to preflood level but in fact was higher. Debt, on the other hand, had also increased. Total debt for this household was then approximately \$15,145. Net worth (equity) was then \$ 42,415 or somewhat less than before the flood. This equity, however, had to support debt levels much higher than before. After two years the debt to equity ratio was 0.36 and the debt 26% of total assets. Not only were these levels very much higher than desired by the households (as compared to preflood levels) but, in fact, were even higher than the households experienced *after* the disaster but before recovery. Likewise, the current ratio had declined to 1.06 and the quick ratio had declined to 0.84. The average household would be able to pay its debts only by depleting its financial assets including securities even if at a loss from cost. There was no cushion for any unforeseen emer-

TABLE III

#### Summary of Household Financial Ratios

Series	Before flood	After flood	Two years later
Current ratio*	3.1	3.1	1.06
Quick ratio**	2.4	2.4	0.84
Debt/Total assets	0.095	0.183	0.26
Debt/Equity	0.10	0.22	0.36
Financial assets/Total assets	0.295	0.576	0.279

\* Defined as financial assets/liabilities.

\*\* Defined as financial assets less marketable securities/liabilities.

gencies or illnesses. Compared to the preflood level, the average household had substantially more debt and a smaller cushion of financial assets than before the flood.

Finally, the ratio of financial assets to total assets was 0.279. The decline in this ratio from its preflood level means that the level of financial assets was lower than what the household had felt was prudent before the flood even though the actual levels of these assets had increased from that prior to the flood. As a result, it is unlikely that the victims will further use financial assets for recovery.

Thus, the recovery process may have permitted the restoration of assets but has done so only by forcing the households to accept a greatly deteriorated financial condition. These results explain why individuals who had apparently been restored to preflood condition complained bitterly that they were actually in much worse condition due to their now being saddled with an SBA loan.

#### **Role of Life Insurance**

It is important to note that in the event of the death of the head of the household the estate would have the proceeds of an insurance policy but, of course, would not be able to use the cash value of insurance nor have to pay back any loans secured by the policy. To examine this aspect, the face value of life insurance policies was determined before the flood and two years later. The average household had life insurance worth \$9,012 after deducting loans on the policy. The current ratio before the flood after deducting the cash value of insurance from financial assets was 4.57 and the quick ratio was 3.78. Two years after the flood the postrecovery value of the insurance had increased to \$9,832 as previously suggested by the increase in cash value. At the same time the postrecovery current ratio had decreased to 1.45 and the quick ratio to 1.23. While debts could still be paid in the

event of death, there was little provision for other unforeseen events such as a long costly illness before death or some other type of financial emergency. Furthermore, if the average household could barely repay its debts, it can be assumed that a large portion of the population would have insufficient financial resources to repay debts.

#### **Implications for Policy**

These results have several implications for the scope and direction of disaster recovery policies. First, it is necessary to be aware that replacement of destroyed assets does not mean that the household has returned to its preflood status. The method of financing the acquisition of these assets must not seriously differ from that which the household felt prudent to follow before the flood and must not seriously alter the claims by outsiders on those assets. For example, if an SBA-type loan program is used, it might be able to provide some type of debt insurance as is done with loans from government chartered credit unions.

Consideration should also be given to variable socioeconomic characteristics when designing recovery programs. While it is not being suggested that older and/or less affluent victims should be completely subsidized, these groups are the least able to withstand the financial impact of a natural disaster. Some attention should be given to their situation when recovery proposals are developed.

#### **Other Results from the Survey**

The change in the financial characteristics found in the survey is a function of the socioeconomic characteristics of the population under study. These are now reviewed.

Questions concerning income, age, marital status, etc. were asked. The average income prior to the flood was \$9,200 while two years after the flood it had increased slightly to

\$9,550. These results are in line with the rule of thumb used by bankers that house value should not exceed two and one-half times annual income (in fact, in this case, it is 2.3 times). This income level places this average household in the lower middle class which corresponds to the finding that of the working respondents 90% had blue-collar or lower white-collar occupations. Over 20% of the respondents were retired, however.

Besides having a lower income level, the residents in the Wilkes-Barre/Wyoming Valley area tend to be older (median age is fifty years), Catholic (65% of the population), and have a median education level of tenth grade. While most were married (over 70%), a surprising number were widowed (16%). These characteristics suggest that the particular population studied here was the least able to withstand the changes in financial position occasioned by the flood.

Several other items were also examined which are now enumerated. One area of interest involves the role of warnings prior to the flood. Only 60% said they heard any warnings and for those that did, the median time was six hours before the flood waters hit. It is also interesting to note that of those who heard the warnings only *one-third* said they believed them. As a result most did nothing, but those who did, attempted to move furniture and other belongings. Of those who did move items, median savings of \$1,200 were obtained. While the savings were small compared to the losses experienced, it demonstrates that adequate warnings, convincingly conveyed, can lead to some savings of property.

Several other financial aspects of the recovery process were also examined. Less than 10% received financial aid for housing and those that did received an average of less than \$150, primarily from the Housing and Urban Development agency. An area of concern was the role of urban renewal. Ten percent of the homes were acquired by the Luzerne County

Redevelopment Authority under the Urban Renewal program. Another 10% of the homeowners said their houses had not been acquired but they wished they had been, primarily because preflood value was paid for acquired homes. In fact, it is probable that an even higher percentage would hold this view today. The role of Urban Renewal in the recovery process is one which deserves more study.

Several other programs also met with varying degrees of success. Less than 40% of the respondents utilized a "mini-repair" program which provided some minor repairs with an average value of \$ 1,000. The food stamp program was better utilized with more than 85% using food stamps for two months on average.

Besides the questions on assets and liabilities several areas concerning financial decision making were also explored. The first involves the early repayment of the SBA loan. Although very favorable terms were available (thirty-year loans at 1% interest rates when market rates were 8 to 10%), a study of other disasters by Faier (1975) suggests that individuals would retire this debt faster than usual. In this survey, of those who took out an SBA loan, more than 30% said they plan to pay off the loan faster. The usual reason given supports the contention that individuals dislike debt because of its claim on assets as well as the aspects of fixed payments.

Another area of interest concerned the declaration of bankruptcy. One way to discharge excessive debts is to declare bankruptcy. While not condoning the abrogation of responsibilities, we included a question about bankruptcy as it was of interest. None of the respondents declared bankruptcy and less than 8% even considered it. The usual reason given for not doing so was that it was immoral. Thus, as there is a strong societal stigma attached to the declaration of bankruptcy it appears to be unimportant in the financial recovery from natural disaster.

It is also of interest to see to what extent other sources of funds for recovery were utilized. For example, only 6% of the respondents received financial aid from the Red Cross. For those who did, the average amount was fifty dollars. Likewise, more than 30% did not obtain any funds from the state government although it was readily available. Those who did, received an average of \$1,650 [9].

Finally, the casualty loss provision of the Federal Tax Code allows the claiming of losses from natural disasters as a deduction on income taxes. Although 98% said they had suffered damage from the flood, only 52% filed a claim for a casualty loss. Furthermore, while the average loss was \$ 24,500, the average casualty loss claim of those who did file a claim was \$ 10,200. Thus, nearly half of the victims did not utilize the casualty loss provisions and those who did, did not take the maximum advantage of this source of funds. Since 25% of the respondents were retired or unemployed, it is likely that they do not pay taxes and could not use this provision. Neither this survey nor the Projector and Weiss (1966) study obtained information on taxes paid but it can be assumed that unemployed or retired households had insufficient taxable income to have a tax liability. However, there appears to be a significant number of households which apparently could have benefitted but did not avail themselves of the opportunity. It can only be surmised that they were unaware of the opportunities available. The fact that the average claim was less than the average loss suggests that victims were unwilling to fully exploit the tax laws for one reason or another. In any case, they offer an underutilized source of relief funds and may represent a possible reduction in the cost of recovery to the government through the use of existing programs. This aspect of the recovery process should be studied further.

## **SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS**

The survey described here has studied the impact of a natural disaster (Tropical Storm Agnes, June, 1972) on a particular community (Wilkes-Barre/Wyoming Valley). While limited in scope the survey uncovers some problems that the current recovery mechanisms create in their impact on the financial conditions of households. It is shown that not only did the financial wealth of the individual household decline due to the disaster but that the mechanisms for recovery further aggravated the situation. It is suggested that the methods to effect recovery from natural disasters need in-depth analyses to determine the financial implications.

It must be emphasized that the analyses done here concentrated on the "average" household. While such an approach is interesting it is also necessary to look at the variations among different age and income groups. Likewise, the impact on other financial characteristics is also important. This article was concerned with the impact of the disaster on the balance sheet accounts, but the impact on income and expenses is also very important. The results presented here suggest that such analyses are needed to determine the total financial impact of natural disasters as well the associated recovery mechanisms. This study does provide a framework for analysis which can be utilized in future research.

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## NOTES

- 1 Further discussion is confined to *natural* disasters. There might be differences in other types of disasters.
- 2 Interested readers may obtain a copy of a report detailing the methodology used in determining the financial characteristics of households from the author.
- 3 Assuming a market value equal to 80% of replacement cost is equivalent to assuming an average age of approximately six to ten years, not an unrealistic assumption.
- 4 The current SBA program has maximum levels for each category and does not have any relationship between structure and contents losses.
- 5 An exception to this generalization is when a financial asset is secured by a physical asset which is destroyed in the disaster. For example, if a household held a mortgage on another piece of property which was destroyed by the flood, the value of that mortgage would be reduced. Since few households lend to others by writing a mortgage, such exceptions are relatively unimportant.
- 6 See Kunreuther (1973) for a discussion of this feature.
- 7 Such comparisons are now in progress utilizing the Projector-Weiss (1966) data but they are beyond the scope of this paper.
- 8 It should be noted that these ratios support the findings of Projector-Weiss (1966). They suggest that older households not only have lower debt ratios but also tend to have far more financial assets (higher current and quick ratios) than other age levels.
- 9 The survey took place during the distribution of the second half of the state grant. Thus, most respondents had received only half of what they ultimately received.

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