# FACTORS IMPACTING ON WHETHER AND HOW BUSINESSES RESPOND TO EARLY WARNING SIGNS OF FINANCIAL AND ECONOMIC TURMOIL: JAMAICAN FIRMS IN THE GLOBAL CRISIS

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**Abstract:** Much of the debate surrounding the recent global crisis is focused on respective governments' policy responses to the financial and economic downturn. Much less attention has been placed on the manner in which private sector businesses responded to the crisis. This study analyses the results of a survey of 284 Jamaican businesses conducted in the first quarter of 2009. It identifies the responses to the crisis that were viewed as most likely at that stage, and uses logistic regression techniques to analyse the factors most likely to precipitate different types of responses. International transmission mechanisms, basic business characteristics, and managers' experiences with and expectations of changing conditions in the finance, output and input markets were investigated as explanatory variables. The results presented are important, as the early response of businesses to economic and financial crisis often determines the extent of the ultimate outcome on the livelihoods of individuals in a country.

**Keywords:** Financial Crisis; Business Expectations; Coping Strategies

## I. INTRODUCTION

Much of the debate surrounding the recent global crisis is narrowly focused on respective governments' policy responses to the financial and economic downturn. Much less attention has been placed on the manner in which private sector businesses, the engine of growth in most economies, responded to the crisis. Pervasive credit crunches, recessions in numerous countries and drastic reductions in global consumption, clearly indicated that most businesses would be affected by the crisis. As with most crisis situations, there were elements of high importance and immediacy that demanded a quick response by businesses, but also high uncertainty, which could translate to inertia or inappropriate responses if not handled properly.[i] It is therefore not surprising that studies conducted immediately after the crisis indicated that in numerous countries many businesses did not react to the crisis in a manner

that made sense given their situations.[ii] Surveys conducted with business managers in developed and emerging economies indicate that large proportions of businesses had not at December 2008 initiated any response to the crisis, many hard-hit companies had not yet undertaken rationalization procedures designed to preserve cash, and numerous financially healthy companies were not taking advantage of the opportunities afforded by the crisis.[iii] By contrast, other studies conducted during the same time period indicated that businesses were responding as expected, by cutting travel, communication and discretionary expenses, reducing inventories and receivables, instituting pay-cuts, laying off staff if necessary, and, where possible, aggressively pursuing new customers and opportunities.[iv]

Much of the early post-crisis literature focusing on business coping strategies has been descriptive. While useful in highlighting ways in which businesses have responded to the crisis in different parts of the world, rigorous analysis is now needed to enhance understanding of why such responses have occurred and to predict the likelihood of similar responses occurring in the future. In previous economic crises affecting developing countries, Olukoshi (1996: 22-33) contributed to the literature by broadly categorizing business coping strategies as involving: rationalization of production and input use; changing managerial strategies and relations; economic diversification and export promotion; and changing marketing, procurement and financial arrangements. He, however, also correctly noted that the choice of coping strategies by different types of entrepreneurs is a varied and complex process impacted by numerous factors. The frequency with which businesses are required to adopt such crisis-coping strategies in an increasingly volatile global economy necessitates further investigation of the factors impacting on whether and how businesses respond to early warning signs of financial and economic turmoil.

The crisis management literature suggests that very few, if any, crises occur without warning signs that precede the acute and chronic crisis stages. Early signal detection and preparation or prevention activities are thus factors that impact on the eventual coping strategies used by businesses (Calloway and Keen, 1996:18-19). In the context of the recent global crisis, the early signals of the crisis outside of the USA were evidenced through international financial and trade transmission mechanisms.[v] Widespread credit crunches and reduced demand for imported goods and services in the USA and other developed country markets provided clear signals that were documented by authors such as Forbes (2000) and Boshoff (2006) in reference to the 'Asian Flu', 'Russian Virus', and the 'Tequila Effect'. The extent to which those signals were evident to and properly interpreted by businesses in the current global crisis is an area that needs to be investigated. This will enable a determination of whether, for example, unresponsiveness or inappropriate responses by businesses was caused, as suggested by Banerji et al (2009:3), by paralysis induced by the sheer speed of the downturn and/or unwarranted optimism by businesses that misread the environment or their position in it.[vi]

Even for those businesses that responded in the expected manner, further analysis is needed to determine whether there are clear differences between those that tended towards rationalization of production and input use, versus those that sought to diversify and expand. For example, were the experiences, expectations and basic business characteristics of businesses that felt compelled to lay off workers or cut wages different from those that sought new markets or alternative sources of finance as means of coping with the crisis? Did the size of the business, ownership structure, or sector within which it operated impact the likelihood of certain types of coping strategy? Or were coping strategies more heavily

impacted by the type of international transmission mechanism most evident in the respective business environments?

Such questions, which have not to date been answered in the context of the current global crisis, are addressed in this paper. Logistic regression techniques are used to analyse the results of a survey of 284 Jamaican businesses conducted in the first quarter of 2009, at a time when awareness of the global economic crisis was high, but the full impact on the country had not yet been felt. Using the Jamaican case study, the existence of factors that predispose certain businesses to be unresponsive to the early warning signs of a crisis is first investigated. The factors impacting the choice of crisis-coping strategies are then analysed for businesses that were responsive to the early warning signs of the crisis. Using an adaptation of Olukoshi's (1996) classification of business coping strategies, the factors impacting on businesses' likelihood of rationalizing production and input use, adjusting staff and managerial relations, and diversifying markets and sources of finance were independently examined. Regression results are also presented for coping strategies of particular interest, to highlight factors which impact, for example, increased likelihood of laying off workers and cutting wages. The explanatory variables theorized as having probable impacts on whether and how businesses respond to early warning signs of crises include basic business characteristics, and managers' experiences with and expectations of changing conditions in the finance, output and input markets.

The results presented in this paper are important, as in a world frequently beset by financial, economic and organizational crises, the speed and effectiveness with which a firm responds to a crisis often affects its 'reputation, credibility, integrity of operations and market performance' (Calloway and Keen, 1996:13). The effects are, however, not limited to firms,

as in crisis situations affecting many firms the coping strategies chosen can have deleterious socio-economic outcomes. Understanding why businesses choose certain crisis coping strategies and predicting how they are likely to respond in future crisis situations enable governments to be better prepared for future crises. This will involve the design of more appropriate crisis response policies that are better targeted at businesses which are likely to adopt coping strategies with the most adverse socio-economic impacts.

The remainder of the paper is organised as follows. The next section provides the contextual analysis by outlining the typical early responses to the global crisis exhibited by Jamaican firms, and highlighting some stylized facts about the Jamaican economy and business environment that may impact such responses. This is followed by a description of the model, data and methodology used to identify the factors that impact on whether and how businesses responded to the early warning signs of the crisis. The results are then presented and analysed, and conclusions are derived.

## 2. CONTEXTUAL ANALYSIS – THE JAMAICAN BUSINESS ENVIRONMENT AND INITIAL REACTIONS TO THE GLOBAL CRISIS

Since the mid to late 1990s, the Jamaican economy has struggled under the burden of high domestic debt associated with recovery from a financial sector crisis.[vii] That, along with an anti-inflationary high interest rate regime, has reduced the private sector's access to affordable credit and, *inter alia,* has effectively stifled economic growth. Other domestic factors impacting on the performance of Jamaican businesses during the 1990s and first half of this decade include: adverse weather conditions affecting the agricultural sector; increased real wages; and the cost of crime. GDP growth has thus been negligible over the past 20 years and unemployment rates have not significantly improved in the recent past. More

recently, dwindling tax revenues and increasing government consumption have widened the fiscal deficit, and, along with an increasing rate of inflation and heightened exchange rate volatility, have also led to concerns regarding macroeconomic stability (see table 1 in appendix).

Jamaican businesses are also exposed to external shocks due to the smallness and openness of the economy. Many businesses are dependent on revenues from the tourism and bauxite industries and on inflows of remittances, which are all heavily influenced by developments in the global economy. Businesses in the distributive trades and the manufacturing, agriculture and tourism sectors are further exposed by their high dependence on imported inputs. Such dependence has led to a high demand for foreign exchange, as the value of imports has been consistently higher than that of exports, with the difference increasing considerably over time (see figure 1 in appendix).

In such an environment, transmission of the effects of the global crisis through trade linkages was expected, as Boshoff (2006:64) predicts that nations exporting to the countries immediately affected by the crisis (Jamaica's major trading partners) are adversely impacted by the recessionary downturn in demand for imports in the crisis countries. An examination of CaPRI's (2009:27) business survey results, however suggests that the relationship is not straightforward, as '85.6% of the businesses surveyed have over 90% of their total market located in Jamaica. This indicates very little diversification across markets, but in the current environment also suggests limited exposure to recession in other countries.' Medium-sized and large businesses are, however, more vulnerable to changes in the external demand for their goods and services, with over 40% of these businesses having up to 60% of their markets in foreign countries. Similarly, almost two-thirds of the respondents from the

tourism sector have significant proportions of their markets originating overseas. It is interesting to also note that 41% of the respondents indicated that their 'primary focus was on provision of intermediate goods... This suggests a high degree of interconnectedness within the domestic economy, and implies that there is considerable potential for contagion if certain businesses are adversely impacted by the crisis.' The large number of small and micro businesses that were not exporting at the time of the global crisis should therefore not have expected to be left unscathed, as it was clear that the effects could have spread very quickly throughout the economy through a small number of local large and medium-sized businesses that were primary clients of many firms.[viii] This was not considered a farfetched possibility, as although only 13% of the respondents indicated a reduction in exports by the end of 2008, nearly two-thirds (61.1%) reported declines in local sales between July and December 2008. Expectations were that local sales would continue declining in the medium to long term (CaPRI 2009:36).

Financial conditions in Jamaica and businesses' early experiences with lines of credit should have also provided businesses with clear signals as to the likelihood of transmission of the global crisis through financial linkages.[ix] Even though a negligible proportion (8%) of Jamaican businesses had credit with foreign financial institutions, Tennant (2009:42) notes that the importance of, and changes in the terms and conditions of loans from local financial institutions, and local and foreign suppliers had greater relevance in businesses' choice of coping strategy. Almost a third (32%) of the businesses surveyed at the time of the crisis had lines of credit with foreign suppliers, and more than half of these businesses considered such credit lines to be critical to the survival of their business. Approximately two-thirds of the respondents also had credit with local financial institutions and suppliers, and similarly regarded such credit lines to be important to their business operations. Considering the

importance of credit to Jamaican business operations, any adverse conditions that would potentially affect the availability and/or terms and conditions of those loans should have precipitated early responses from the business community. The global crisis provided the adverse stimulus, exhibited by the fact that although most respondents indicated no changes in the terms and conditions of loans from foreign suppliers when surveyed in January-March 2009, significantly larger proportions expected worsening conditions in the medium to long term. Similar results were derived with respect to lines of credit from local sources, with the cost, availability and maturity of credit expected to worsen in the medium to long term (CaPRI 2009:23-25).

The delay in the financial transmission of the effects of the global crisis to Jamaica is explained by reference to the country's experience with financial sector crisis in the mid to late 1990s. The governor of the Jamaican central bank noted that:

> *The Jamaican economy has encountered periods of difficulty in the past. We have learned from those experiences, and have for many years been building a sound banking system and a responsive monetary policy framework. We have also been ensuring that we maintain a reasonable level of reserves for insurance. There was therefore some cushioning as we entered this period of global financial and economic downturn... The banking reforms of earlier years ensured that Jamaican banks were adequately capitalized above the BIS standard, and were subject to strict regulatory requirements and oversight. Consequently, our exposure to the troubled global financial institutions has so far been minimal'* (Latibeaudiere 2009).

The cushioning from adequate bank capitalization and minimal initial exposure could not, however, outlast the persistent global credit crunch and heightened risk aversion that intensified as the crisis continued through to the end of 2008. Some Jamaican financial institutions were called upon by international banks to repay loans at short notice, commercial importers lost credit facilities, unfavourable reports from rating agencies adversely affected Jamaica's sovereign bonds, and international capital markets remained

closed to emerging market economies. With these developments, demand pressures in the Jamaican foreign exchange market intensified, reflected in a depreciation of 9.7% in the value of the Jamaican dollar in the last quarter of 2008. This led to expectations of worsening local financial conditions and precipitated intervention by the central bank, as outlined below:

i. *Establishment of a Special Loan Facility in foreign currency... for security dealers and deposit taking institutions with foreign currency needs to repay margin arrangements on GOJ global bonds.*
ii. *Establishment of an Intermediation Facility in foreign currency... to facilitate the flow of credit in the system.*
iii. *Extension of the foreign currency Intermediation Facility to include deposits and loans in local currency.*
iv. *Increasing interest rates across the spectrum of open market instruments...*
v. *Offering of a special 15-day CD to primary dealers and commercial banks...*
vi. *An increase in the statutory cash reserve requirement from 11% to 13%...*
vii. *Intervention sales of US$432.1 million in the foreign exchange market...* (Latibeaudiere 2009).

In spite of these measures, the exchange rate continued to depreciate, necessitating continued tight monetary policies. This, along with the prolonged global recession, led to negative growth in the Jamaican economy in the final quarter of 2008, and official projections of further negative growth in the first quarter of 2009, with the central bank noting that 'the outlook for the economy remains surrounded by a high degree of uncertainty.'[x] With these ominous signs, early responses to the crisis by Jamaican businesses were expected. The results of the CaPRI survey, however, indicated that 20.4% of the businesses surveyed noted that they did not plan to make any adjustments to their business operations in response to the global crisis. Such a high level of unresponsiveness to the global crisis is not uncommon, as the results of a 2008 survey of 245 Latin American companies indicate that 25% of the respondents had not then implemented actions in response to the economic downturn. By 2009, however, this number had reduced to 11%, highlighting the large number of firms that squandered the possible benefits of early response (Watson Wyatt Worldwide 2009:3). The

factors precipitating unresponsiveness to early warning signs of crises clearly therefore require careful examination to ascertain whether remedial measures are warranted and, if so, whether they are possible.

It is also instructive to note that of the businesses that indicated an intention to respond to the early warning signs of the crisis, most (91.3%) did not see a need to shut down operations, 67.4% were unlikely to lay off workers and 77% were unlikely to reduce workers' wages. CaPRI (2009:40) asserts that these results suggest that 'business owners and managers were attempting to shield their workers from the adverse effects of the crisis by minimizing adjustments that would directly affect staff.' This conclusion has to, however, be more rigorously examined in a regression framework that allows for the consideration of a range of possible explanatory factors. Other coping strategies that proved to be unpopular with Jamaican businesses were the reduced use of local and foreign inputs (with 62.6% and 61.7% of respondents, respectively, indicating that such responses were unlikely). The early coping strategies with a greater likelihood of being adopted by Jamaican businesses included reducing 'other' benefits to staff (51.7%), reducing non-staff related expenses (85.2%), seeking alternative markets (67%), and seeking alternative sources of finance (52.2%).

The wide range of coping mechanisms being adopted by Jamaican businesses as early responses to the crisis, along with the large proportion of businesses that were unresponsive, provides a rich ground for analysis of the factors that impacted whether and how businesses respond to early warning signs of financial and economic crises. The model and methodology used to conduct this analysis are detailed in the subsequent section.

## 3. ECONOMIC MODEL, DATA AND METHODOLOGY

**The Model**

The model adopted in this paper seeks to identify the factors which impact on whether and how businesses respond to early warning signs of financial and economic crises. As illustrated in equation 1, a number of different types of business responses (BUSres) are investigated.

$$BUSres = \sum (UNRES, RATION, MANREL, DIVER) \ldots (1)$$

In addition to the businesses that were unresponsive (UNRES), an adaptation of Olukoshi's (1996) classification of business coping strategies was used to broadly classify those that were responsive to the early warning signs of the crisis as being likely to rationalize production and input use (RATION), adjust staff and managerial relations (MANREL), and diversify markets and sources of finance (DIVER).

Equation 2 theorizes the respective responses of businesses to be a function of managers' early experiences with the crisis (EXPer), their expectations in the medium to long term as economies and industries adjust to the crisis (EXPect), and certain basic characteristics of the business (BUSchar).

$$BUSres = f(EXPer, EXPect, BUSchar) \ldots . (2)$$

Managers' experiences and expectations with regards to the impact of the crisis are influenced by their perception of the extent to which the crisis has been and will be transmitted to their business. In the context of the current global crisis, the literature on international transmission mechanisms is instructive, as the effects of financial crises typically cross borders via financial and/or trade linkages. Forbes (2000) and Boshoff (2006)

both indicate that credit crunches, decreased exports and reduced competitiveness of exports are the most common manifestations of such transmission mechanisms.[xi] Equations 3 and 4 thus illustrate this relationship by presenting managers' experiences and expectations as being dependent on credit (CREDlin) and trade (TRADElin) linkages well established in the literature.

$$EXPer = f(CREDlin, TRADElin) \quad (3)$$

$$EXPect = f(CREDlin, TRADElin) \quad (4)$$

Finally, as indicated in equation 5, the basic characteristics of a business that are expected to impact on whether and how businesses respond to a crisis include those which influence the business' likelihood of being impacted by the crisis (CHARimp), and those which influence its ability to respond to the crisis (CHARres).

$$BUSchar = \Sigma(CHARimp, CHARres) \quad (5)$$

When combined, these theorized relationships are captured in the preliminary econometric model outlined below:

$$BUSres = \alpha + \beta_1 EXPer + \beta_2 EXPect + \beta_3 BUSchar + \varepsilon \quad (6)$$

with: BUSres representing the range of possible responses outlined in equation 1;
EXPer and EXPect representing variables that highlight the theorized credit and trade linkages outlined in equations 3 and 4;
BUSchar representing the two categories of business characteristics outlined in equation 5; and

ε being a disturbance term controlling for all other unaccounted explanatory factors.

## Data and Variables

Primary data, collected by the Caribbean Policy Research Institute (CaPRI), were used in the estimations. A survey of Jamaican businesses was conducted between January and March 2009. The target population was all businesses operating in Jamaica, stratified by size, sector and location (county). The sampling frame used was a database of all companies that are serviced by the sole provider of electricity in the country. This had the advantage of including both formal and informal businesses. A sample size of 400 businesses was targeted, and ultimately a random sample of 284 firms completed the survey.

The variables used are derived from the questions asked in the survey instrument, which focused on measuring businesses' degree of direct and indirect exposure to the US crisis, managers' experiences since the crisis and expectations in the medium to long run, and basic characteristics of the businesses.

### The Dependent Variable – Business' Responses to the Global Crisis

Respondents were asked to indicate whether or not they planned to make adjustments in response to the global crisis. Those that did not are highlighted as being unresponsive to the early warning signs of the crisis (UNRES), while those that indicated an intention to make adjustments were then asked to rank their likelihood of undertaking eight types of coping strategies. These were classified as follows:

- Laying off workers, reducing the use of local inputs, and reducing foreign inputs – *Rationalization of Production and Input Use (RATION);*

- Cutting wages, reducing staff benefits, and decreasing non-staff expenses – *Adjusting Staff and Managerial Relations (MANREL);* and
- Seeking alternative markets, and alternative sources of finance – *Diversification of Markets and Financing (DIVER).*

The variables were re-coded, with 0 indicating that a response is unlikely and 1 likely.

**The Independent Variables**

*EXPer* and *EXPect* are designed to reflect businesses' early experiences with the effects of the crisis and expectations of further effects in the medium to long term. Such experiences and expectations are influenced by the perceived transmission of the crisis through credit and trade linkages. These transmission mechanisms are captured by a series of variables in which respondents were asked to indicate whether they experienced or expected changes in the following areas:

- Credit availability, Credit maturity, Cost of Credit, and Size of loans (CREDlin); and
- Quantity and Price of goods and services sold, and Availability and Cost of inputs (TRADElin).

For EXPer, with each of these variables, 0 indicates no change and 1 indicates a worsening of conditions. For EXPect, 0 indicates no expected change, 1 indicates expected worsening of conditions, and 2 indicates expected improvements.[xii]

Although the literature typically limits the credit linkage transmission of crises to decreases in the availability of credit, this paper also includes other terms and conditions of loans as possible explanatory variables to capture less obvious ways in which the effect of volatility in credit markets may be transmitted to businesses. Similarly, although the trade linkage transmission of crises typically focuses only on reduced quantity and competitiveness of

exports, the impact of the crisis on the cost and availability of inputs is also examined. The import dependence of the Jamaican economy necessitates such an examination, as if credit crunches and declining output in the overseas crisis economies cause input prices to increase and availability to decrease, adverse real sector outcomes are likely.[xiii]

The basic characteristics of a business (*BUSchar*) are also expected to impact on whether and how businesses respond to a crisis. This is because some such characteristics can influence a business' likelihood of being impacted by the crisis (CHARimp), while others influence its ability to respond to the crisis (CHARres). Those characteristics that were tested under CHARimp include:

- whether or not the business had deposits or investments with foreign financial institutions (as a proxy for direct exposure to the crisis);
- the importance of different sources of credit utilized by the business (including credit from foreign and local financial institutions and suppliers);
- the sector in which the business operates;
- the extent to which it relies on export markets (measured by the proportion of its total market which is outside of Jamaica); and
- the business' primary product line (classified as basic necessities, intermediate goods/services, medium-cost non-essential goods/services, consumer durables, or luxury goods/services).

The characteristics that were used as proxies for CHARres include:

- the size of the business (measured by both the number of employees and the value of total assets);

- the ownership structure of the firm (classified as sole proprietorship, partnership or limited liability company); and
- the number of years that the business has been operational.

**Methodology**

Many of the above variables are derived from responses to Likert-Scale type questions, and as such, most are ordinal, while a few are nominal. The dependent variables in all specifications of the model are binary, which necessitates the nesting of equation 6 within a logistic probability function, as follows:

$$F(Z_i) = p_i = e^{Zi}/(1 + e^{Zi}) \quad \ldots (7a)$$

Equation 7a can be transformed into the more intuitive functional form below:

$$\ln\left(\frac{p_i}{1-p_i}\right) = Z_i \quad \ldots (7b)$$

where $Z_i = \text{BUSres}_i = \alpha + \beta_{1j}\,\text{EXPer}_{ij} + \beta_{2j}\,\text{EXPect}_{ij} + \beta_{3j}\,\text{BUSchar}_{ij} + \varepsilon_i \quad \ldots (7c)$

And:

$\text{BUSres}_i$ = 1 if the *i*th firm intends to or has undertaken the response under consideration

= 0 if it does not

$p_i$ = the probability that $\text{BUSres}_i = 1$. Therefore, $p_i/(1-p_i)$ is the odds of the *i*th firm engaging in the response under consideration, and Equation 7b predicts the logarithm of the odds (referred to as the logit) for each value of the explanatory variables.

$\text{EXPer}_{ij}$ = the value of the *j*th explanatory variable relating to the experiences of the *i*th firm

$EXPect_{ij}$ = the value of the *j*th explanatory variable relating to the expectations of the *i*th firm

$BUSchar_{ij}$ = the value of the *j*th explanatory variable relating to the basic business characteristics of the *i*th firm

$\varepsilon_i$ = a disturbance term

Before the model was estimated, tests of sampling adequacy and multicollinearity were conducted. Cross-tabulations were used to ascertain whether empty or extremely small cells are present in the dataset. Checks were made to ensure that cell frequencies were not less than one and no more than 20% of the cells in any estimation were less than five. So as not to risk instability in the logistic model due to sampling inadequacy, it was necessary in a few instances to combine the categories of categorical independents and to discard some variables. The approach used by Vandersmissen et al (2004) and Menard (1995) was used to test for multicollinearity. Simple regression models were estimated using the dependent and independent variables under consideration. The Variable Inflation Factor (VIF) and the tolerance measure were used, with a tolerance of 0.2 or less and/or a VIF of 5 or more indicating problems of multicollinearity (de Vaus 2002).

Due to the large number of variables representing the experiences and expectations of managers and the characteristics of the businesses, it was not possible to include them all in the full model. In order to eliminate variables that did not have a significant impact on the response of businesses to the crisis, backward stepwise methods based on the likelihood ratio (LR) test were used to estimate a model that only included the constant and one explanatory variable. If the results suggest that there is no statistically significant change in the log likelihood ratio (-2LL) when the explanatory variable under consideration is dropped from

the model (thus leaving only the constant), that variable was not included in the full model. This was sequentially done for each of the explanatory variables.

The full model for each of the dependent variables was then estimated using the explanatory variables determined in the manner described above. The Hosmer and Lemeshow (H-L) chi-square test of goodness of fit was conducted to determine the overall fit of the logistic regression model. If the H-L goodness-of-fit test statistic was insignificant (that is, > 0.05), the null hypothesis that there is no difference between observed and model-predicted values was not rejected. This implies that the model's estimates fit the data at an acceptable level. While it does not suggest that the model necessarily explains much of the variance in the dependent, it indicates that what it does explain is significant.[xiv] The Omnibus Test of Model Coefficients was also conducted to test if the model with the predictors is significantly different from the model with only the intercept. When significant, it is concluded that there is an adequate fit of the data to the model, indicating that at least one of the predictors is significantly related to the dependent variable. The Nagelkerke's $R^2$ is reported for all models as a measure of strength of association, and 2 by 2 classification tables are used to match actual outcomes with predicted outcomes as an indication of the model's predictive precision of group membership. Additionally, outlier cases defined as three standard deviations about its mean were removed. Finally, the significance of each of the explanatory variables was reported. All variables that are insignificant at the 10% level were removed from the respective models. This results in the more parsimonious reduced form models, which were then subjected to all the above-mentioned tests. These models, along with the relevant test results are reported in the subsequent section.

## 4. RESULTS AND ANALYSIS

Table 2 (in the appendix) presents the frequencies of all the variables utilized in the reduced form models. Most of the businesses surveyed were small limited liability companies, with small businesses representing 53.2% of the sample and limited liability companies representing 75%. Notwithstanding this, there were sufficient numbers of respondents from all sizes and types of business to facilitate rigorous analysis, as all tests of sampling adequacy were satisfied. Changing staff and managerial relations (MANREL) was the most popular category of business response to the crisis (71.8%), followed by seeking alternative markets/financing (DIVER – 64.4%), rationalization of production/input use (RATION – 47.5%), and unresponsiveness (UNRES – 20.4%). Adverse early experiences with the crisis were clearly not widespread, with only 34.7% and 30.5% of respondents experiencing decreases in the availability and maturity of credit. Conditions were, however, expected to worsen in the medium to long term, particularly through two primary credit linkages – expected decreases in credit availability (identified by 52.5% of respondents) and expected increases in the cost of credit (51.8%). There was more ambivalence regarding expectations about the maturity of credit (with equal proportions of respondents expecting no change and a decrease in the maturity - 45.8%), the size of credit (with 38% expecting a decrease and 50.7% expecting an increase), and the availability of inputs (with 21.1% expecting a decrease and 71.5% no change).

Table 3 highlights the variables that were insignificant in all specifications of the models being tested and, as such, had no impact on whether or how Jamaican businesses responded to the early warning signs of the global crisis. Many of the variables relating to the early experiences of businesses with the crisis were insignificant, confirming the delayed impact of the crisis on the country and therefore on businesses' decisions regarding their responses.

Much fewer of the variables relating to businesses' expectations were similarly insignificant. Interestingly, the only insignificant variables in this regard related to the theorized trade linkages, with expected changes in the quantities and prices of goods sold and costs of inputs having no statistically significant impact on businesses' decisions as to whether or how they should respond to the crisis. When this is considered along with the insignificance of all the trade linkage indicators relating to the early crisis experiences of Jamaican businesses, the international transmission of the crisis to Jamaica through this mechanism must be called into question.

The consistent insignificance of all the basic characteristics that were expected to influence a business' likelihood of being impacted by the crisis is also noteworthy. The insignificance of whether or not the business had overseas deposits and/or investments and of the relative importance of credit sources provides support for the central bank governor's claim that the Jamaican financial system was insulated from direct exposure to the global crisis. This is because if there was direct exposure through the financial system, then overseas investments or heavy reliance on ruptured sources of credit would have been expected to significantly impact the type of response chosen by affected businesses, or at the very least, should have had a significant and negative relationship with the likelihood of a firm being unresponsive. Similarly, the insignificance of the extent to which businesses rely on export markets, the sector in which they are involved, and of their primary product line, suggests that impact through the output markets did not influence the nature of response to the crisis. This does not suggest that there was no impact, but rather that even if there was an impact, it did not determine whether and how businesses responded.

By contrast, fewer of the variables theorized to influence a firm's ability to respond to the crisis were insignificant. Although the number of years a firm has been operational and the value of assets of the business were consistently insignificant, the significance (in some model specifications) of the size of the business as measured by the number of employees and the ownership structure of the business, suggests that the ability to respond to the crisis was an important factor in determining the nature of businesses' response to the crisis.

Table 4 presents the logistic regression results for all the reduced form models estimated. Each model sought to predict the likelihood of one of the four categories of response under consideration. In each instance, sampling adequacy was ensured, there was no multicollinearity, outliers were removed, and the Hosmer and Lemeshow and Omnibus Tests indicated that the models' estimates adequately fit the data. The Nagelkerke $R^2$ for the respective estimations range from 0.149 to 0.325. Although this test statistic can range from 0 to 1, values above 0.3 are reasonable in studies of this nature. With the exception of the model with DIVER as the dependent variable, the Nagelkerke $R^2$ values are above or just below the average for models of this type. The classification tables for each specification indicate that the models predict between 68.3% and 79.1% of all responses correctly. The percentage of likely responses predicted correctly are fairly good for all the models (ranging from 59.2% to 95.8%), except for the model with UNRES as the dependent variable (for which only 9.3% of the likely responses are predicted correctly). The models also perform well in correctly predicting the not likely responses, with the percentage of correct predictions ranging from 34.2% to 98%, and with less than 50% of the unlikely responses being predicted in only one instance. The general model statistics thus indicate that the models perform fairly well in predicting the values of the respective dependent variables.

Most of the variables that remained in the reduced form models were significant at the 1% level, with a few being significant at the 5% level, and a maximum of two variables in any one specification being significant at the 10% level. In most instances, the variables had signs that conformed to theory, with plausible explanations being proffered for the remainder in subsequent paragraphs.

The results from the first specification indicate that early experiences with reduced availability of credit increase the likelihood of responses to the crisis that involve rationalization of production and input use (RATION). A similar relationship is also exhibited with respect to expected reductions in the availability of credit. Conversely, firms which expect an increase in the availability of credit in the medium to long term are less likely to rationalize production and input use. These relationships clearly conform to theory, and highlight the critical impact that credit crunches and the threat thereof can have on an economy through the responses of businesses.

The relationships between RATION and the other explanatory variables are not as straightforward. There is, for example, a very significant negative relationship between expected decreases in the size of credit and the likelihood of firms' rationalizing production and input use, which is not easily explained. An examination of the logistic regression results of the models seeking to explain each of the specific responses which comprised RATION also does not clarify the issue. Table 5 indicates that a decrease in credit size does not have a significant relationship with any of the component responses under RATION. There is no plausible explanation as to why, when grouped, responses classified as involving rationalization of production and input use should be less likely to be adopted when firms expect a reduction in the size of the loans being issued.

A similar phenomenon is exhibited in regards to expectations about the maturity of credit. Although there is the expected positive relationship between an expected decrease in credit maturity and RATION, there is a much stronger and more significant positive relationship with expected increases in credit maturity. Table 5, however, indicates that amongst those responses categorized as RATION, only the reduced use of local inputs is significantly impacted by expectations about the maturity of credit. Here, although expectations of an increase in the maturity of credit increases the likelihood of reduced use of local inputs, there is a stronger and more significant positive relationship with expected decreases in credit maturity, suggesting the converse relationship that conforms to theoretical expectations. This, however, does not explain why, when grouped, the responses classified as RATION exhibit relationships with the maturity of credit that do not conform to theory.

The results also indicate that firms are more likely to adopt responses to the crisis involving rationalization of production and input use when interest rates (i.e. the cost of credit) are expected to decrease. As indicated in Table 5, this result is strong and highly significant in regards to the laying off of workers, suggesting that when interest rates decrease, businesses are more likely to fire staff. This result also seems to be counterintuitive, as basic economic theory suggests that a future reduction in interest rates should allow businesses to borrow more and thus expand their operations. Prevalent Jamaican macroeconomic policies since liberalization of the economy in the early 1990s, however, provide a plausible explanation for two of the contrary relationships exhibited.

In attempts to combat inflation, finance the budget deficit, and defend the local currency, the GOJ has for the past two decades consistently implemented high-interest rate policies and has

issued high-yielding Treasury Bills. As noted in section 2, even in response to the current global crisis, while other countries were reducing interest rates, the Bank of Jamaica increased interest rates across the spectrum of open market instruments. This has resulted in many Jamaican businesses developing an appetite for high-yielding and virtually risk-free government instruments, which is not limited to financial institutions, but extends to businesses and individuals across all sectors of the economy. Many entrepreneurs have thus made more profits from the returns on financial transactions than from productive ventures in the real sector. In this context, an expected reduction in interest rates may not be viewed positively by businesses, as it would imply a decrease in revenue from their portfolio of financial instruments, which would in turn necessitate the laying off of staff and other measures to rationalize production and input use.

When viewed in this light, an expected increase in maturities may also be cause for alarm for businesses heavily invested in financial instruments, as the turn-around time on financial investments would be prolonged, leading to cash flow problems. The positive relationship between the likelihood of firms rationalizing production and inputs and such an expected increase in maturities is thus plausible in this context, as if cash flow is constrained by the extension of maturities on financial investments, businesses will be forced to cut costs at least until adequate liquidity is restored. The conflicting results for this explanatory variable may thus have been caused by the fact that some respondents interpreted the questions about the maturity of credit as referring to loans, while others may have thought about the implications of extended maturities on their portfolio of financial instruments.

For the first category of business responses to the crisis, it is also instructive to note that there were a few explanatory variables that were not significant for predicting the likelihood of

rationalization of production or input use, but were significant predictors of one or more of the responses that comprised RATION. For example, Table 5 indicates that firms which experienced reductions in the prices of their goods/services early in the crisis period are more likely to lay-off workers. Limited liability companies are also more likely to lay-off workers and reduce use of foreign inputs than sole proprietorships. This is expected, as sole proprietorships often do not have as many cost cutting options as do limited liability companies, and even when they do, limited liability companies tend to be more likely to exercise those options because the separation between owners, managers and staff of such companies, and the heavy emphasis on earning dividends, often adds an additional layer of governance and accountability which precipitates enhanced efficiency and a willingness to take unpopular decisions. The results also indicate that firms with a greater number of employees are more likely to reduce use of local inputs, highlighting the greater capacity that larger firms have to respond in crisis situations by scaling down operations. This is instructive, as there may be considerable spin-off effects of the reduced use of local inputs by larger firms, in an economy where many small firms are producers of intermediate goods and services.

In the second specification, which sought to predict the likelihood of firms' responding to the crisis by changing staff and managerial relations, three variables are significant predictors. Firms that experienced a decrease in the availability of credit were more likely to engage in responses categorized as MANREL, again highlighting the importance of credit crunches in precipitating rapid responses by businesses. Limited liability companies are also more likely to engage in such responses than were sole proprietorships. The results presented in table 6 further indicate that this relationship is particularly prevalent for businesses that are likely to reduce non-staff expenses in response to the crisis. This conforms to the results previously

reported, as the organizational structure of limited liability companies better enables cost cutting measures in crisis situations.

Conflicting results for expected changes in the maturity of credit are also evident in this estimation, again highlighting the plausibility of the explanation previously given. That is, respondents which viewed an expected decrease in the maturity of credit as adversely affecting their outstanding loans were more likely to cut expenses by changing staff and managerial relations, while a similar response could also reasonably be expected from firms that perceived an expected increase in maturities as adversely affecting cash flow positions through the impact on their portfolio of financial instruments. Table 6 further indicates that the unique relationship between interest rates and the nature of businesses' responses to the crisis also exists in this category of responses. In the last column it is shown that firms which expect interest rates to decrease are more likely to reduce staff benefits. This highly significant and strong relationship also supports the argument that the response of Jamaican businesses to changing conditions in financial markets is heavily influenced by their holdings of financial instruments, and thus may have different consequences from those expected by policymakers.

There were also two explanatory variables that were not significant for predicting the likelihood of the grouped variable – changing staff and/or managerial relations – but were significant predictors of one or more of the responses that comprised MANREL. Businesses that experience early decreases in the size of loans issued are more likely to cut the wages of their staff as a coping mechanism. Increases in the cost of inputs have also been shown to precipitate a similar response, and will also increase the likelihood of businesses reducing benefits to staff.

The results for the third broad category of businesses' response to the crisis are presented in the penultimate column of table 4. The model for DIVER is straightforward, as the variables which predict the likelihood of businesses seeking to diversify into new markets and financing arrangements all have the expected relationships. Firms that experience and expect a reduction in the availability of credit are more likely to seek to diversify. As highlighted in table 7, this applies both to their likelihood of seeking alternative markets and new sources of finance. Table 4 also indicates that businesses with more employees are also more likely to diversify, again reflecting the greater capacity of larger businesses to engage in a wider range of responses in crisis situations. Smaller firms tend to be constrained in their ability to be similarly flexible. When the proclivity of firms to seek alternative markets and financing are independently modelled, the results presented in table 7, however, show that the number of employees loses its significance, and instead the ownership structure of businesses becomes an important predictor of behaviour. Limited liability companies are more likely than sole proprietorships to seek alternative markets, while both limited liability companies and partnerships are more likely than sole proprietorships to seek new sources of finance. The limitations of sole proprietorships and very small businesses in responding to crises in an opportunistic manner are thus clearly seen. The resources needed to capitalize on opportunities presented in new markets are often not available to such businesses, and likelihood of them attaining different sources of funds is very low due to the unavailability of suitably designed financing arrangements, such as venture capitalists, angel funds and junior stock exchanges.

Finally, the last column in table 4 presents the results of the model that sought to predict the likelihood of a business being unresponsive to the early warning signs of a financial and

economic crisis. The model, however, performed much better at predicting the likelihood of firms not being unresponsive, as significant negative relationships were exhibited with experienced and expected decreases in the availability of credit, and expected decreases in the maturity of credit. The relationships all suggest that a worsening of conditions in the credit market will lessen the likelihood of firms being unresponsive. Conversely, a positive relationship with expected increases in the availability of inputs suggests that firms which expect such an increase are more likely to be unresponsive to the early warning signs of the crisis. Similarly, a decrease in the maturity of credit is likely to precipitate increased unresponsiveness. As previously explained, if such a decrease is reflected in a shortening of the maturities of financial instruments held by businesses, then improved cash flows may have resulted or have been expected, which would present a cushion against the adverse effects of the credit crunch and thus precipitate unresponsiveness.

## 5. CONCLUSIONS

This paper has sought to highlight the factors which impact on whether and how businesses respond to early warning signs of financial and economic crises. In a volatile global economy frequently impacted by widely spread financial, economic and organizational crises, the speed and effectiveness with which firms respond to crises not only impacts their reputation and performance, but, depending on the coping strategies chosen by businesses, can also have pervasive adverse socio-economic outcomes. Using the results of a survey of Jamaican businesses conducted in the early stages of the global crisis, this paper has modelled four categories of businesses' responses to crises: unresponsiveness to the early warning signs of crises; rationalization of production and input use; changing staff and managerial relations; and diversification to seek alternative markets and financing. The explanatory variables used in the models include the experiences of businesses in the nascent

stages of the crisis, the expectations of businesses as economies adjust in the medium to long term, and the basic characteristics of businesses which influence the likelihood of their being impacted by the crisis and their capacity to respond to the crisis.

Logistic regression techniques were used to estimate the models and to highlight the variables that are important in predicting the likelihood of businesses undertaking each of the crisis response strategies under consideration. The results indicate that firms which experience or expect reductions in the availability of credit are less likely to be unresponsive in the early stages of the crisis, and are more likely to undertake all the coping strategies modelled. This confirms the theorized international transmission of crises by credit crunches, and highlights the impact of such crunches on livelihoods in small developing economies, as they increase the possibility of widespread unemployment and increased hardship for workers as staff benefits are cut. If governments wish to alleviate such consequences, temporary central bank support to the financial system to facilitate the flow of credit may be useful. The ultimate effectiveness of such support is, however, dependent on the persistence of the credit crunch and the fundamental stability of domestic financial institutions.

The impact of crisis-induced changes on other financial variables was not as straightforward in the Jamaican context. It was shown, for example, that expected post-crisis reductions in interest rates increase the likelihood of workers being laid off and staff benefits being reduced. Expected increases in the maturity of credit also increase the likelihood of wages being cut and non-staff expenses being reduced. These results are best explained by the large appetite that Jamaican businesses have for Treasury Bills and other financial instruments, as a consequence of the Government of Jamaica's persistent use of high interest rate anti-inflationary policies. Many businesses have relatively large portfolios of financial

instruments that in the recent past have been more profitable than their productive real sector activities. The opportunities for borrowing presented by reduced interest rates and lengthened maturities thus pale in comparison with the costs of lost revenues and stymied cash flows from financial investments. This has significant policy implications, as the GOJ is now seeking to reduce interest rates with the expectation that this will automatically foster an expansion of economic activity. The results of this study strongly suggest that the opposite will in fact occur if businesses are not otherwise encouraged to reduce their reliance on financial investments and return to productive activities. This will in turn not be possible until the government reduces domestic borrowing by cutting the fiscal deficit.

The results also indicate that businesses will be more likely to lay off workers if they experience reductions in the prices of their goods and services in the nascent stages of the crisis, and are more likely to cut wages and reduce benefits to staff if they experience increases in the costs of their inputs. The traditional international transmission of the crisis through reduced quantity and competitiveness of exports was not shown to significantly impact whether or how businesses respond to crises. Similarly, the insignificance of the extent to which businesses rely on export markets, the sector in which they are involved, and of their primary product line, suggests that impact through the output markets did not have as important an impact on the nature of businesses' response to the crisis as predicted by theory.

More important were the basic characteristics of businesses that influenced their capacity to respond in diverse manners. The ownership structure of firms was shown to significantly impact the likelihood of at least one crisis coping strategy in each of the three broad categories of responses under consideration. Limited liability companies are more likely than sole proprietorships to respond to crises by laying-off workers, reducing the use of foreign

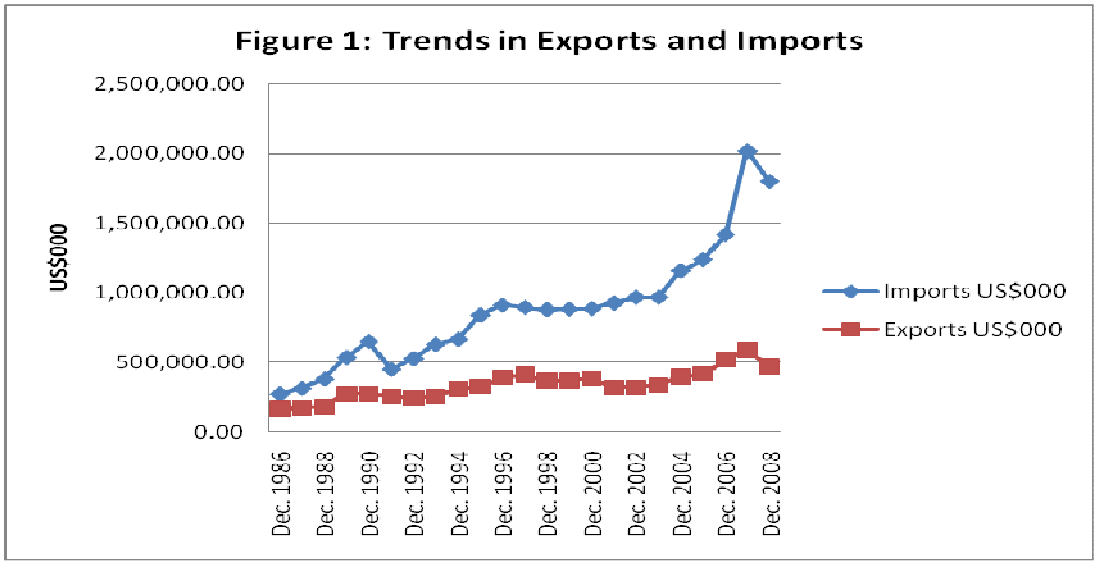
inputs, decreasing non-staff expenses, and seeking alternative markets and financing. The implications are clear – sole proprietorships are relatively limited in their capacity to respond to crises in diverse manners. Not only do they lack the resources to respond to crises in an opportunistic manner, but they also often do not have as many cost-cutting options as do limited liability companies, or the fortitude to exercise such options when available.

Finally, it was shown that larger companies are more likely to respond to crises by reducing the use of local inputs and by diversifying into new markets and sources of finance. The first of these findings highlights the heightened proclivity of large firms to respond in crisis situations by scaling down operations, which clearly has economy-wide implications in a country where many small firms are producers of intermediate goods and services. The second highlights the challenges faced by small firms, as the resources needed to capitalize on opportunities presented in new markets are often unavailable, and the likelihood of them attaining new sources of funds is low due to the dearth of suitably designed financing arrangements in many developing country contexts.

## APPENDICES

| Table 1 - Selected Indicators of Economic Performance | | | | | | |
|---|---|---|---|---|---|---|
| **Year** | **Economic Growth (%)** | **Unemployment Rate (%)** | **Inflation Rate (%)** | **Average Annual Exchange Rate J$ per US$** | **Adjusted Central Government Balance** | |
| | | | | | Fiscal Year | % of GDP |
| 1992 | 1.7 | 15.8 | 40.2 | 23.01 | 92/93 | 3.7 |
| 1993 | 2.4 | 16.2 | 30.1 | 25.68 | 93/94 | 3.0 |
| 1994 | 1.0 | 15.4 | 26.7 | 33.35 | 94/95 | 3.1 |
| 1995 | 2.5 | 16.2 | 25.6 | 35.54 | 95/96 | 1.8 |
| 1996 | 0.0 | 16.0 | 15.8 | 37.02 | 96/97 | -6.3 |
| 1997 | 0.0 | 16.5 | 9.2 | 35.58 | 97/98 | -8.7 |
| 1998 | -1.0 | 15.5 | 7.9 | 36.68 | 98/99 | -12.3 |
| 1999 | 1.0 | 16.0 | 6.8 | 39.33 | 99/00 | -8.3 |
| 2000 | 0.9 | 15.5 | 6.1 | 43.32 | 00/01 | -5.5 |
| 2001 | 1.3 | 15.0 | 8.8 | 46.09 | 01/02 | -5.7 |
| 2002 | 1.0 | 14.2 | 7.1 | 48.54 | 02/03 | -8.0 |
| 2003 | 3.5 | 11.4 | 13.8 | 57.93 | 03/04 | -9.9 |
| 2004 | 1.4 | 11.7 | 13.7 | 61.34 | 04/05 | -8.6 |
| 2005 | 1.0 | 11.2 | 12.6 | 62.50 | 05/06 | -4.8 |
| 2006 | 2.7 | 10.4 | 5.7 | 65.88 | 06/07 | -4.7 |
| 2007 | 1.5 | 9.8 | 16.8 | 69.06 | 07/08 | -4.8 |
| 2008 | -0.9 | 10.6 | 16.8 | 72.92 | 08/09 | -7.2 |

*Sources: Bank of Jamaica, Statistical Digest, various issues,* www.boj.org.jm
CARICOM Secretariat, *Caribbean Trade and Investment Report*, 2000




*Source: Bank of Jamaica, Statistical Digest, various issues*

| Table 2 - Description & Frequencies of Variables Used in the Reduced Form Models | | | |
|---|---|---|---|
| | **Code** | **#** | **%** |
| **BUSres** | | | |
| RATION (Not Likely) | 0 | 149 | 52.5 |
| RATION (Likely) | 1 | 135 | 47.5 |
| MANREL (Not Likely) | 0 | 80 | 28.2 |
| MANREL (Likely) | 1 | 204 | 71.8 |
| DIVER (Not Likely) | 0 | 101 | 35.6 |
| DIVER (Likely) | 1 | 183 | 64.4 |
| UNRES (Not Likely) | 0 | 226 | 79.6 |
| UNRES (Likely) | 1 | 58 | 20.4 |
| **EXPer** | | | |
| ExperienceCreditAvailability (no change) | 0 | 177 | 65.3 |
| ExperienceCreditAvailability (decrease) | 1 | 94 | 34.7 |
| ExperienceCreditMaturity (no change) | 0 | 182 | 69.5 |
| ExperienceCreditMaturity (decrease) | 1 | 80 | 30.5 |
| **EXPect** | | | |
| ExpectedCreditAvailability (no change) | 0 | 112 | 39.4 |
| ExpectedCreditAvailability (decrease) | 1 | 149 | 52.5 |
| ExpectedCreditAvailability (increase) | 2 | 23 | 8.1 |
| ExpectedCreditMaturity (no change) | 0 | 130 | 45.8 |
| ExpectedCreditMaturity (decrease) | 1 | 130 | 45.8 |
| ExpectedCreditMaturity (increase) | 2 | 24 | 8.5 |
| ExpectedCreditCost (no change) | 0 | 119 | 41.9 |
| ExpectedCreditCost (decrease) | 1 | 18 | 6.3 |
| ExpectedCreditCost (increase) | 2 | 147 | 51.8 |
| ExpectedCreditSize (no change) | 0 | 144 | 50.7 |
| ExpectedCreditSize (decrease) | 1 | 108 | 38.0 |
| ExpectedCreditSize (increase) | 2 | 32 | 11.3 |
| ExpectedAvailabilityInputs (no change) | 0 | 203 | 71.5 |
| ExpectedAvailabilityInputs (decrease) | 1 | 60 | 21.1 |
| ExpectedAvailabilityInputs (increase) | 2 | 21 | 7.4 |
| **BUSchar** | | | |
| Ownership (Sole Proprietorship) | 0 | 51 | 18.0 |
| Ownership (Partnership) | 1 | 20 | 7.0 |
| Ownership (Limited Liability) | 2 | 213 | 75.0 |
| Number Employees (Micro 0-4) | Included as Continuous Variable | 55 | 19.4 |
| Number Employees (Small 5-50) | | 151 | 53.2 |
| Number Employees (Medium 51-100) | | 43 | 15.1 |
| Number Employees (Large over 100) | | 35 | 12.3 |

| Table 3 - Insignificant Variables in all Reduced Form Specifications | |
|---|---|
| **EXPer** | **BUSchar** |
| *CREDlin* | *CHARimp* |
| ExperienceCreditCost | Deposits/InvestmentsFFI |
| ExperienceCreditSize | Importance of Respective Sources of credit |
| *TRADElin* | ProportionMarketOverseas |
| ExperienceQuantityGoodsSold | Sector |
| ExperiencePriceGoodsSold | PrimaryProductLine |
| ExperienceAvailabilityInputs | *CHARres* |
| ExperienceCostInputs | ValueAssets |
| **EXPect** | YearsOperational |
| *TRADElin* | |
| ExpectedQuantityGoodsSold | |
| ExpectedPriceGoodsSold | |
| ExpectedCostInputs | |

| Table 4 - Logistic Regression Results – Reduced Form Models | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Variables** | **RATION** | | | **MANREL** | | | **DIVER** | | | **UNRES** | | |
| | **B** | **SE** | **Exp(B)** | **B** | **SE** | **Exp(B)** | **B** | **SE** | **Exp(B)** | **B** | **SE** | **Exp(B)** |
| **EXPer** | | | | | | | | | | | | |
| ExperienceCreditAvailability (decrease) | 1.017*** | 0.322 | 2.765 | 1.298*** | 0.411 | 3.664 | 0.575* | 0.336 | 1.778 | -2.142*** | 0.691 | 0.117 |
| ExperienceCreditMaturity (decrease) | | | | | | | | | | 1.776*** | 0.682 | 5.908 |
| **EXPect** | | | | | | | | | | | | |
| ExpectedCreditAvailability (decrease) | 1.106** | 0.550 | 3.022 | | | | 0.873*** | 0.309 | 2.393 | -1.353** | 0.591 | 0.259 |
| ExpectedCreditAvailability (increase) | -1.576* | 0.872 | 0.207 | | | | 0.184 | 0.552 | 1.202 | 0.575 | 0.833 | 1.776 |
| ExpectedCreditMaturity (decrease) | 0.749* | 0.432 | 2.115 | 1.194*** | 0.339 | 3.301 | | | | -1.187** | 0.596 | 0.305 |
| ExpectedCreditMaturity (increase) | 2.534*** | 0.763 | 12.604 | 1.395** | 0.692 | 4.037 | | | | -21.131 | 10886.941 | 0.000 |
| ExpectedCreditCost (decrease) | 1.626** | 0.782 | 5.084 | | | | | | | | | |
| ExpectedCreditCost (increase) | -0.037 | 0.365 | 0.963 | | | | | | | | | |
| ExpectedCreditSize (decrease) | -1.415*** | 0.539 | 0.243 | | | | | | | | | |
| ExpectedCreditSize (increase) | -0.996 | 0.685 | 0.369 | | | | | | | | | |
| ExpectedAvailabilityInputs (decrease) | | | | | | | | | | -0.431 | 0.529 | 0.650 |
| ExpectedAvailabilityInputs (increase) | | | | | | | | | | 1.442* | 0.796 | 4.228 |
| **BUSchar** | | | | | | | | | | | | |
| Ownership (Partnership) | | | | -0.131 | 0.583 | 0.878 | | | | | | |
| Ownership (Limited Liability) | | | | 0.988*** | 0.355 | 2.685 | | | | | | |
| NumberEmployees | | | | | | | 0.005** | 0.002 | 1.005 | | | |
| **Constant** | -0.941*** | 0.227 | 0.390 | -0.644** | 0.328 | 0.525 | -0.277 | 0.206 | 0.758 | -0.346 | 0.218 | 0.707 |
| N | 271 | | | 271 | | | 266 | | | 253 | | |
| Nagelkerke R-square | 0.252 | | | 0.270 | | | 0.149 | | | 0.325 | | |
| % of likely responses predicted correctly | 59.20% | | | 95.80% | | | 76.80% | | | 9.30% | | |
| % of not likely responses predicted correctly | 76.00% | | | 34.20% | | | 54.10% | | | 98.00% | | |
| Overall % predicted correctly | 68.30% | | | 77.90% | | | 68.40% | | | 79.10% | | |
| Hosmer & Lemeshow Test (sig) | 0.888 | | | 0.077 | | | 0.731 | | | 0.641 | | |
| Omnibus Test of Model Coefficients (sig) | 0.000 | | | 0.000 | | | 0.000 | | | 0.000 | | |

*** 1% Significance, ** 5% Significance, * 10% Significance

| Table 5 – Logistic Regression Results – Ungrouped Dependent Variables: RATION | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Variables** | **↑ Layoffs** | | | **↓ Use of Local Inputs** | | | **↓ Use of Foreign Inputs** | | |
| | **B** | **SE** | **Exp(B)** | **B** | **SE** | **Exp(B)** | **B** | **SE** | **Exp(B)** |
| **EXPer** | | | | | | | | | |
| ExperienceCreditAvailability (decrease) | 1.193*** | 0.367 | 3.296 | | | | 1.214*** | 0.321 | 3.365 |
| ExperiencePricesGoodsSold (decrease) | 1.376*** | 0.519 | 3.960 | | | | | | |
| ExperiencePricesGoodsSold (increase) | -0.148 | 0.376 | 0.862 | | | | | | |
| **EXPect** | | | | | | | | | |
| ExpectedCreditAvailability (decrease) | 0.190 | 0.457 | 1.209 | | | | | | |
| ExpectedCreditAvailability (increase) | -1.793* | 0.998 | 0.166 | | | | | | |
| ExpectedCreditMaturity (decrease) | | | | 1.15*** | 0.310 | 3.158 | | | |
| ExpectedCreditMaturity (increase) | | | | 0.908* | 0.522 | 2.480 | | | |
| ExpectedCreditCost (decrease) | 2.019*** | 0.686 | 7.528 | | | | | | |
| ExpectedCreditCost (increase) | 0.121 | 0.413 | 1.129 | | | | | | |
| **BUSchar** | | | | | | | | | |
| Ownership (Partnership) | 0.232 | 0.823 | 1.261 | | | | -0.274 | 1.198 | 0.761 |
| Ownership (Limited Liability) | 0.954* | 0.502 | 2.596 | | | | 1.474** | 0.626 | 4.367 |
| NumberEmployees | | | | 0.003*** | 0.001 | 1.003 | | | |
| Constant | -2.689*** | 0.576 | 0.068 | -1.874*** | 0.260 | 0.154 | -3.115*** | 0.616 | 0.044 |
| | | | | | | | | | |
| N | 271 | | | 279 | | | 271 | | |
| Nagelkerke R-square | 0.246 | | | 0.119 | | | 0.164 | | |
| % of likely responses predicted correctly | 21.70% | | | 8.00% | | | 0.00% | | |
| % of not likely responses predicted correctly | 97.50% | | | 98.50% | | | 100.00% | | |
| Overall % predicted correctly | 78.20% | | | 74.20% | | | 79.70% | | |
| Hosmer & Lemeshow Test (sig) | 0.150 | | | 0.250 | | | 0.899 | | |
| Omnibus Test of Model Coefficients (sig) | 0.000 | | | 0.000 | | | 0.000 | | |

*** 1% Significance, ** 5% Significance, * 10% Significance

| Table 6 – Logistic Regression Results – Ungrouped Dependent Variables: MANREL | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Variables** | **↓ Non-Staff Expenses** | | | **Cut Wages** | | | **↓ Staff Benefits** | | |
| | **B** | **SE** | **Exp(B)** | **B** | **SE** | **Exp(B)** | **B** | **SE** | **Exp(B)** |
| **EXPer** | | | | | | | | | |
| ExperienceCreditAvailability (decrease) | 1.13*** | 0.377 | 3.096 | | | | 1.216*** | 0.292 | 3.374 |
| ExperienceCreditSize (decrease) | | | | 0.964** | 0.388 | 2.621 | | | |
| ExperienceCostInputs(increase) | | | | 0.898** | 0.437 | 2.456 | 0.713** | 0.305 | 2.040 |
| **EXPect** | | | | | | | | | |
| ExpectedCreditMaturity (decrease) | 0.991*** | 0.323 | 2.694 | -0.202 | 0.416 | 0.817 | | | |
| ExpectedCreditMaturity (increase) | 1.588** | 0.698 | 4.893 | 0.999* | 0.555 | 2.717 | | | |
| ExpectedCreditCost (decrease) | | | | | | | 2.403*** | 0.813 | 11.054 |
| ExpectedCreditCost (increase) | | | | | | | 0.075 | 0.291 | 1.078 |
| **BUSCHAR** | | | | | | | | | |
| Ownership (Partnership) | -0.030 | 0.583 | 0.970 | | | | | | |
| Ownership (Limited Liability) | 1.266*** | 0.352 | 3.546 | | | | | | |
| Constant | -0.928*** | 0.331 | 0.395 | -2.500*** | 0.401 | 0.082 | -1.421*** | 0.293 | 0.241 |
| | | | | | | | | | |
| N | 271 | | | 258 | | | 265 | | |
| Nagelkerke R-square | 0.269 | | | 0.122 | | | 0.198 | | |
| % of likely responses predicted correctly | 96.20% | | | 10.60% | | | 50.90% | | |
| % of not likely responses predicted correctly | 32.20% | | | 98.60% | | | 84.50% | | |
| Overall % predicted correctly | 75.60% | | | 82.60% | | | 70.60% | | |
| Hosmer & Lemeshow Test (sig) | 0.336 | | | 0.934 | | | 0.951 | | |
| Omnibus Test of Model Coefficients (sig) | 0.000 | | | 0.000 | | | 0.000 | | |

*** 1% Significance, ** 5% Significance, * 10% Significance

| Table 7 – Logistic Regression Results – Ungrouped Dependent Variables: DIVER | | | | | | |
|---|---|---|---|---|---|---|
| | Alternative Markets | | | Alternative Financing | | |
| Variables | B | SE | Exp(B) | B | SE | Exp(B) |
| **EXPer** | | | | | | |
| ExperienceCreditAvailability (decrease) | 0.885*** | 0.271 | 2.423 | 1.101*** | 0.269 | 3.008 |
| **BUSCHAR** | | | | | | |
| Ownership (Partnership) | 0.129 | 0.553 | 1.137 | 1.043* | 0.566 | 2.837 |
| Ownership (Limited Liability) | 0.703** | 0.335 | 2.020 | 0.699* | 0.363 | 2.011 |
| NumberEmployees | | | | | | |
| Constant | -0.765** | 0.305 | 0.465 | -1.308*** | 0.338 | 0.270 |
| | | | | | | |
| N | 271 | | | 271 | | |
| Nagelkerke R-square | 0.091 | | | 0.116 | | |
| % of likely responses predicted correctly | 45.00% | | | 46.10% | | |
| % of not likely responses predicted correctly | 76.30% | | | 80.10% | | |
| Overall % predicted correctly | 60.10% | | | 65.70% | | |
| Hosmer & Lemeshow Test (sig) | 0.622 | | | 0.901 | | |
| Omnibus Test of Model Coefficients (sig) | 0.000 | | | 0.000 | | |

*** 1% Significance, ** 5% Significance, * 10% Significance

| Table 8 – Frequency Table: Ungrouped Dependent Variables | | | | |
|---|---|---|---|---|
| **Dependent Variables** | **Likely** | | **Not Likely** | |
| | **#** | **%** | **#** | **%** |
| **Rationalization** | | | | |
| Close Business | 19 | 6.7 | 265 | 93.3 |
| ↑ Layoffs | 74 | 26.1 | 210 | 73.9 |
| ↓ Local Inputs | 77 | 27.1 | 207 | 72.9 |
| ↓ Foreign Inputs | 60 | 21.1 | 224 | 78.9 |
| **Managerial Relations** | | | | |
| Cut Wages | 53 | 18.7 | 231 | 81.3 |
| ↓ Staff Benefits | 119 | 41.9 | 165 | 58.1 |
| ↓ Reduce Non-Staff Expenses | 195 | 68.7 | 89 | 31.3 |
| **Diversification** | | | | |
| Alternative Markets | 151 | 53.2 | 133 | 46.8 |
| Alternative Financing | 119 | 41.9 | 165 | 58.1 |

## ENDNOTES

[i] Calloway and Keen (1996:18-19)
[ii] See for example Heckmann et al (2009) and Banerji et al (2009)
[iii] Based on a survey of 828 corporate managers in developed and emerging economies, Banerji et al (2009: 6) note that between a quarter and a third of hard-hit companies had not at December 2008 accelerated their efforts to preserve cash, the most logical immediate course of action. Similarly, one-quarter of the financially healthy companies surveyed were not taking advantage of the opportunities afforded by the crisis.
[iv] Raghavan (2009:1-2) http://www.slideshare.net/achalraghavan/the-economic-downturn-coping-strategies-and-the-way-forward
[v] See Boshoff (2006) and Forbes (2000) for a discussion of the mechanisms through which financial crises are transmitted across countries.
[vi] This is supported by the results of psychoanalytic research in organizational crises which suggest that 'individuals in crisis-prone organizations, compared to crisis-prepared organizations, are seven times more likely to use defense mechanisms, such as denial, disavowal... and... grandiosity' (Pearson and Clair 1998:62).
[vii] See Kirkpatrick and Tennant (2002), Tennant (2006) and Tennant and Kirton (2006) for a discussion of the causes, consequences and legacies of the Jamaican financial sector crisis of the mid to late 1990s.
[viii] 'This is evidenced by the fact that although the primary client/customer base of Jamaican businesses is spread across a wide array of mainly local clients, over a third (35%) of the respondents noted that their primary clients were local large and medium-sized businesses, with the next most frequently identified category of primary clientele being local entrepreneurs and self-employed workers (14.8%)' (CAPRI 2009).
[ix] See Boshoff (2006:64-65) for a discussion of this type of transmission mechanism.
[x] Latibeaudiere (2009),
http://www.boj.org.jm/news/news_htmls/governor_s_quarterly_press_briefing_feb_09.pdf
[xi] Forced portfolio re-composition also forms part of Boshoff's (2006) financial transmission channel. Forced portfolio re-composition occurs as investors in the crisis country sell assets. If the assets to be sold are from countries other than the one in crisis, markets are unable to distinguish between countries in crisis and those not in crisis. Forbes (2000:8), however, argues that the empirical evidence relating to this channel is ambiguous. This transmission mechanism is not included in this study, as early in the crisis there were no signs to suggest that it would have had a major impact in the Jamaican context. Also, there are no data to reliably measure its impact. Forbes (2000) and Boshoff (2006) also mention psychological linkages, wherein investor behaviour and information asymmetries can lead to herding or informational cascades. This linkage is also not included in this model, as difficulties were encountered similar to those highlighted by Boshoff (2006:63) in testing the psychological phenomena associated with this channel.
[xii] With the exception of expectations regarding cost of credit and cost of inputs, where 0 indicates no expected change, 1 indicates expected improvements, and 2 expected worsening of conditions.
[xiii] The availability and cost of local inputs can also be impacted by the US crisis, as many intermediate goods are also import dependent.
[xiv] http://www2.chass.nesu.edu/garson/PA765/logistic.htm

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