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STOCK MARKET DEVELOPMENT AND ECONOMIC GROWTH IN THE U.S.: WHAT HAVE WE LEARNED?

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Abstract

Past empirical analysis of the relationship between financial development and economic growth in the US suggests that capital market development has no impact on long-run economic growth. However, analysis of the same data used previously reveals the existence of trends and breaks which past studies failed to take into account, hence, rendering their results questionable. Therefore, this paper uses recent advances in time series techniques and investigates the issue again within a VEC model that allows for the presence of trends and breaks in the data. In this framework, we test for long-run causality between stock market development and economic growth after controlling for banking development and stock market volatility. Using three alternative measures of stock market development, the findings of our empirical analysis provide strong evidence that capital market development has a long-run causal impact on output growth in the US.

Keywords

Stock Market Development, Economic Growth, U.S. Financial Development, Capital Markets

Introduction

Past empirical analysis of the relationship between financial development and economic growth in the US suggests that capital market development has no impact on long-run economic growth. However, analysis of the same data used previously reveals the existence of trends and breaks which past studies failed to take into account, hence, rendering their results questionable.

Therefore, this paper uses recent advances in time series techniques and investigates the issue again within a VEC model that allows for the presence of trends and breaks in the data. In this framework, we test for long-run causality between stock market development and economic growth after controlling for banking development and stock market volatility. Using three alternative measures of stock market development, the findings of our empirical analysis provide strong evidence that capital market development has a long-run causal impact on output growth in the US.

One of the most enduring debates in economics is about the relationship between financial development and long-run economic growth. The question bears upon whether finance can be a leading sector in the economy or it simply follows the growth of output generated elsewhere. Recently, in light of the explosive growth experienced by global equity markets, this debate has focused on the particular contribution of stock market development to long-run economic growth. In this respect, a growing body of literature investigating this issue has emerged, but no consensus has been reached. On one hand, there are studies which suggest that stock market development promote economic growth. These include Atje and Jovanovich (1993), Obstfeld (1994), Greenwood and Smith (1996), Korajczyk (1996), Bencivenga, et. al. (1996), Levine and Zervos (1996, 1998). For example, Greenwood and Smith (1996) show that large stock markets lower the cost of mobilizing savings, facilitating investments in the most productive technologies. Obstfeld (1994) shows that international risk-sharing through internationally integrated stock markets improve resource allocation and can accelerate growth. Focusing on liquidity, Bencivenga, et. al. (1996) argue that stock market liquidity plays a key role in economic growth by allowing firms to permanently access to capital raised through equity issues. Liquidity is also supposed to increase investors' incentive to acquire information on firms and improve corporate governance (Holmstrom and Tirole, 1993). Within the new growth theory framework, Levine and Zervos (1998) examined this issue empirically and found a positive and significant correlation between stock market development and economic growth.

On the other hand, there are studies which questioned the role of stock markets in promoting economic growth. For example, Stigliz (1985) argues that developed stock markets quickly reveal information through price changes, creating a free rider problem and reducing investor incentives to spend resources to conduct costly search. Demirguch-Kunt and Levine (1996) have questioned the role of liquidity in promoting economic growth. They argue that increased liquidity can deter growth at least in three different ways. First, by increasing returns to investments, high stock market liquidity may reduce savings rates through income and substitution effects. Second, by reducing the uncertainty associated with investment, greater stock market liquidity may reduce savings rates due to the ambiguous effects of uncertainty on savings. Third, stock market liquidity encourages investor myopia, adversely affecting corporate governance and thereby reducing economic growth.

In light of this controversial debate and the conflicting results emerging from the empirical literature, this paper's aim is to empirically investigate the causal relationship between stock market development and long-run economic growth in the particular case of the United

States. While, the US stock market is one of the most developed markets in the world, past empirical research did not provide any clear evidence on whether or not its development promotes economic growth. In this respect, the only available time series analysis of US data by Arestis et. al. (2001) raised doubts about the ability of the US stock market to promote long-run economic growth. Their results suggest that the financial sector in the US is rather following the growth of real output generated elsewhere.

However, using recent advances in time series techniques, analysis of the same data used by Arestis et. al. (2001) revealed the existence of trends and breaks in the US data which they failed to incorporate in their analysis, hence, rendering their results questionable. In particular, the existence of linear trends in the data requires special specification and treatment of the deterministic components of the model and the cointegration space which, if ignored, leads to incorrect inferences (Johansen, 1991, 1992, 1994). Moreover, Arestis et. al. failed to test for unit roots under the trend-break hypothesis, which resulted in the misspecification of the correct order of integration of the variables and the appropriate breaks in the data. Finally, Arestis et. al. (2001) estimated cointegrating vectors that include dummy variables as intercepts in the long-run relationships, a practice that is not allowed in cointegration analysis. As Johansen (1991, 1992, 1994) has clearly showed, dummy variables should be allowed only as part of the deterministic components of the model.

Therefore, this paper proposes to reinvestigate the issue after allowing for the existence of trends and breaks in the data. In this respect, the present analysis differs from that of Arestis et. al. (2001) in three important ways. First, we consider how different assumptions about the constant and linear terms in the autoregressive model affect the results of cointegration and Granger-causality for nonstationary variables. As shown by Johansen (1994), the misspecification of these terms has serious consequences on the results of cointegration. Therefore, before testing for Granger-causality, we use the Johansen (1994) testing procedure and identify the deterministic components that should be included in the model. It turns out that the US data contain a deterministic linear trend that is consistent with the inclusion of an intercept term in the long-run relationships, something that was ignored in previous analysis. Second, in contrast to the classical unit-root tests used by Arestis et. al. (2001), we herein test for unit roots under the possibility of structural breaks in the trend functions of the variables, and that by using the Perron (1997) testing procedure. It turns out that the US data contain many breaks that were not taken into account in previous analysis. In particular, the orders of integration of the variables are found to be different of those reported in Arestis et. al. (2001). Finally, our treatment of structural breaks in the data differs significantly from that adopted previously. In Arestis et. al., the treatment of breaks was made by including dummy variables in the long-run relationships. However, consistently with Johansen (1991, 1992, 1994), the present analysis includes dummy variables in the deterministic part of the model in order to account for structural breaks.

We test for the existence and direction of long-run causality between stock market development and economic growth in the US, after controlling for the effects of banking development and stock market volatility. In particular, we experiment with three alternative measures of stock market development; the ratio of stock market transactions to market valuation, the ratio of stock market transactions to GDP, and the ratio of stock market capitalization to GDP. For all three measures, the empirical results provide strong evidence that capital market development promotes long-run economic growth in the US.

The remaining of the paper is organized as follows. Section II presents the econometric methodology. Section III presents the empirical results and section IV concludes.

The Econometric Methodology

A Vector Error-Correction Model of Financial Development and Growth

To model the intertemporal interaction between real output (*Y*), banking sector development (*B*), stock market development (*S*) and stock market volatility (*SMV*), we represent their short-run dynamics by a vector autoregressive (VAR) model where all variables are allowed to be endogenous. Then the idea that some or all of the variables share common stochastic trends (i.e cointegrated) can be tested and exploited to model their interaction within a vector error-correction (VEC) model, which captures both the short-run and the long-run dynamics of the variables.

Consider a VAR(k) model of the form

$$X_t = \Phi_1 X_{t-1} + \Phi_2 X_{t-2} + \ldots + \Phi_k X_{t-k} + \mu + \delta D_t + \eta_t, \qquad t=1, \ldots, T, \tag{1}$$

where X_t is a 4 x 1 vector containing *Y*, *B*, *S*, and *SMV* and D_t is a matrix containing deterministic variables such as trend and dummies. D_t can also include stochastic variables that are weakly exogenous and excluded from the cointegration space. Suppose for the time being that the variables in X_t are I(0) after applying the differencing filter once. If we exploit the idea that there may exist comovements of these variables and possibilities that they will trend together towards a long-run equilibrium state, then by the Granger representation theorem, we may posit the following testing relationships that constitute our vector error-correction (VEC) model

$$\Delta X_t = \Gamma_1 \Delta X_{t-1} + \Gamma_2 \Delta X_{t-2} + \ldots + \Gamma_{k-1} \Delta X_{t-k+1} + \Pi X_{t-1} + \mu + \delta D_t + \eta_t ,$$

$$t = 1,\ldots,T \tag{2}$$

where Δ is the first difference operator, Γ's are estimable parameters, η_t is a vector of impulses which represent the unanticipated movements in X_t, with $\eta_t \sim niid(0, \Sigma)$, and Π is the long-run

parameter matrix. With r cointegrating vectors ($1 \leq r \leq 3$), Π has rank r and can be decomposed as $\Pi = \alpha\beta'$, with α and β both 4 x r matrices. β are the parameters in the cointegrating relationships and α are the adjustment coefficients which measure the strength of the cointegrating vectors in the VEC model,

$$\Delta X_t = \Gamma_1 \Delta X_{t-1} + \Gamma_2 \Delta X_{t-2} + \ldots + \Gamma_{k-1} \Delta X_{t-k+1} + \alpha\beta' X_{t-1} + \mu + \delta D_t + \eta_t \,, \quad t = 1,\ldots,T \tag{3}$$

Hence, the cointegration methodology illustrates well the conflict that exists between the equilibrium framework and the disequilibrium environment from which the data are collected. As formulated in the VEC model in (3), this conflict can be easily resolved by extending the equilibrium framework into one that accounts for disequilibrium by including the equilibrium error measured by ($\beta' X_{t-1}$). Once the equilibrium conditions are imposed, the model is now describing how the system is adjusting towards its long-run equilibrium state. Since the variables are supposed to be cointegrated then, in the short-run, deviations from the long-run equilibrium will feed back on the changes in the dependent variables in order to force their movements towards the long-run equilibrium state. Thus, the adjustment coefficients α measure the proportion by which the long-run disequilibrium (or imbalance) in the dependent variables are corrected in each short-term period.

Therefore, following Toda and Phillips (1993, 1994), Hall and Milne (1994), and Giles and Mirza (2000), imposing a zero restriction on the adjustment coefficients in (3) can be interpreted as a test of long-run Granger noncausality. Johansen and Juselius (1992) term this test as a test of weak exogeneity. A variable is weakly exogenous if its adjustment coefficient is zero, implying that it is not adjusting to the long-run equilibrium relationships. This also means that the long-run movement of the variables in the cointegration space does not have any influence on its short-run behavior.

Johansen (1988) developed the estimation of the VEC model using a maximum likelihood procedure which tests the cointegrating rank *r* and estimates the parameters β and α. The recent literature has demonstrated that the Johansen cointegrating approach performs in general better than a range of other procedures for estimating the cointegrating vectors (Gozalo 1994; Hargreaves 1994; Toda 1995; Haug 1996, among others). For example, Gonzalo (1994) reports, from simulation experiments, that Johansen's estimator has superior finite sample performance compared to many other methods for estimating the parameters of the cointegrating vectors. Toda (1995) reports that, for samples containing at least one hundred data points, the asymptotic distributions of Johansen's statistics are good approximations to the exact distributions when the null hypothesis is true.

Specification of the Deterministic Components

It is important to note that the two test statistics proposed by Johansen to test for cointegration, Trace and λ_{max} (maximum eigenvalue), have asymptotic distributions that are not invariant to the assumptions regarding the presence of deterministic components in the model (intercept, trend, and dummies). The asymptotic distributions of the tests for cointegration change depending on what assumptions are made regarding these terms. This means that misspecification of the deterministic components leads to incorrect cointegration tests and misleading inferences. In fact, Johansen (1988) derived the cointegration test based on a VAR model without a constant term; he extended this test to a model that includes an intercept in his 1991 paper. It turns out also that the asymptotic distributions of the test for cointegration changes depending on whether or not the processes contain linear trends in the nonstationary components. Johansen (1991, 1994) provides a proof of Granger's representation theorem which clarifies the effects of misspecification of the deterministic components and shows that, under certain conditions, the VEC model would be an I(1) process.

Thus, to enable use of the correct distributions of the Johansen cointegration test statistics, we should correctly specify the deterministic components of the VAR model. This is a critical issue because different assumptions about the deterministic components have different implications regarding the data generating processes and about the cointegration space.

In order to choose the specification that is in accordance with the data, we can adopt a general-to-specific modeling strategy whereby, starting with the unrestricted model, we gradually impose restrictions on the deterministic components and identify those that should be retained in the model. In our case, we specify the unrestricted model by setting $D_t = t$ to allow a linear trend in the model in addition to the intercept. With this, both the intercept and the time component are present in VAR and, the model in (2) can be rewritten as

$$\Delta X_t = \sum_{i=1}^{k-1} \Gamma_i \Delta X_{t-i} + \alpha\beta' X_{t-1} + \mu + \delta t + \eta_t, \qquad t = 1, \ldots, T \tag{4}$$

Now to see how different assumptions on the deterministic components lead to different model specifications with different implications concerning the data processes and the cointegration space, we decompose δ and μ as follows

$$\delta = \alpha\delta_1 + \alpha_\perp\delta_2$$

$$\mu = \alpha\mu_1 + \alpha_\perp\mu_2$$

where:

$\delta_2 = \alpha_\perp(\alpha_\perp'\alpha_\perp)^{-1}\alpha_\perp'\delta$ is a (4 - r)-dimensional vector of quadratic trend coefficients in the data,

$\delta_1 = \alpha(\alpha'\alpha)^{-1}\alpha'\delta$ is an r-demensional vector of linear trend coefficients in the cointegrating relations,

$\mu_2 = \alpha_\perp(\alpha_\perp'\alpha_\perp)^{-1}\alpha_\perp'\mu$ is a (4 – r) dimensional vector of linear trend slopes in the data, and

$\mu_1 = \alpha(\alpha'\alpha)^{-1}\alpha'\mu$ is an r-dimensional vector of intercepts in the cointegration relations.

Using this decomposition, the unrestricted model in (3) can be rewritten as

$$\Delta X_t = \sum_{i=1}^{k-1} \Gamma_i \Delta X_{t-i} + \alpha \begin{pmatrix} \beta \\ \mu_1 \\ \delta_1 \end{pmatrix}' \widetilde{X}_{t-1} + \alpha_\perp \mu_2 + \alpha_\perp \delta_2 t + \eta_t , \qquad t = 1, \ldots, T \tag{5}$$

in which $\widetilde{X}_{t-1} = (X'_{t-1} \quad 1 \quad t)$.

Now, depending on the restrictions imposed on the deterministic components, we can distinguish between the following 5 plausible model specifications (see Johansen and Juselius 1990, Johansen 1992, and Johansen 1994).

Model1: the unrestricted model. In this case no restrictions are imposed on δ and/or μ. This model is consistent with the existence of quadratic trends in the data and, hence, linear trends in the differenced series. This specification is more appropriate in cases of quadratic growth in the variables.

Model2: $\delta_2 = 0$, δ_1, μ_1, μ_2 unrestricted. In this case the model excludes quadratic trends but allows the cointegration space to contain a linear trend since $\delta_2 \neq 0$. This is the case where the variables are allowed to be trend stationary and, this trend stationarity can be allowed for the series or for the cointegrating relationships.

Model3: $\delta = 0$, and μ_1, μ_2 are unrestricted. In this case since $\mu_2 \neq 0$ the model allows for linear trends in the data through μ_2 but no trends in the cointegrating relations. Given that $\mu_1 \neq 0$ the cointegrating relations have a non-zero intercept.

Model4: $\delta = 0$, and $\mu_2 = 0$, but μ_1 unrestricted. In this case the model does not allow for linear trends in the data. The only deterministic component present in the model is the intercept in the cointegrating relationships.

Model5: $\delta = 0$, and $\mu = 0$. In this case there are no deterministic components in the data, and all intercepts in the cointegration relations are zero. This is an extreme case where no intercepts are allowed at least to account for data measurement.

Johansen (1992, 1994) proposed a sequential testing procedure to select the appropriate deterministic components and, hence, enable use of the appropriate cointegration test. Despite the serious implications of misspecification of the deterministic part of the model on the results

of cointegration, the survey conducted by Giles and Mirza (2000) indicates that this issue was neglected in the applied research using the Johansen cointegration procedure.

In particular, Arestis et. al. (2001) used the most restrictive model (Model5) in the case of the US, excluding by that all the deterministic components of the data. If, however, the assumption of no deterministic components in the data does not hold, the results of cointegration and long-run Granger causality become questionable.

Following Johansen (1994) and making use of the Johansen (1992) λ^2-test based on the so-called Pantula principle (Pantula 1989), we herein use a sequential procedure that allows to jointly select the model (Model1, …, Model5) and the cointegrating rank *r*. The procedure is as follows. Let C_{rm} denote the combination of rank and model where *r* is the rank (*r* = 1, 2, 3, 4) and *m* is the model (*m* = Model1, …, Model5). Since Model1 is the unrestricted model, we start by selecting between Model1 and Model2. Then, in the second phase, the retained model will be tested against Model3. We continue this procedure until model5. In each one of these phases we select jointly the model and the cointegrating rank *r*.

To sequentially select between two competing combinations we start by fixing the rank starting with *r* = 1. Then we select the model for which the trace statistic passes the critical value, and that starting with the most restrictive model. If neither model is selected, we change the rank to the higher order and repeat the procedure until one of the two models is selected. For example, for the models Model1 and Model2, we sequentially test and choose between C_{r1} and C_{r2}, for *r* = 1, …,4. Starting with the most restrictive combination C_{02}, we compare the trace test statistic of this model to the corresponding critical value. If the model is rejected we keep the rank assumption (*r* = 1) and change to model2 (i.e C_{01}). If this model is also rejected, we change the rank to *r* = 2 and repeat the same procedure. So we keep changing the rank and model until the first time the joint hypothesis concerning the rank and model specification is accepted. Once a model is selected (either Model1 or Model2), the selected model will be tested against Model3 using the same procedure and, the process continues until a particular specification is selected with a specific rank.

Testing for Unit Roots

The issue of whether macroeconomic time series should be modeled as difference stationary processes or as trend stationary processes has received considerable attention during the past two decades. Since the publication of the study by Nelson and Plosser (1982) who found evidence of difference stationarity in US macroeconomic variables, almost all applied research using the Dickey-Fuller (1979) unit root test confirmed the conclusion that most macroeconomic time series contain unit roots.

However, Perron (1989) demonstrated that the Dickey-Fuller test is biased against rejecting the null hypothesis of a unit root when the true data generating process is in fact trend

stationary with a break in the intercept or the slope of the trend function. Consequently, Perron (1989) proposed to test the unit root null using a modified Dickey-Fuller test which specifies the alternative under the following three characterizations of the trend-break:

The Crash Model: This model allows for a change in the intercept under the null and alternative hypotheses. In addition, this change is assumed to occur gradually and in a way that depends on the correlation structure of the noise function. This model was termed the "innovational outlier model" in the terminology of Perron (1989) and will be denoted later by model IO1. The null hypothesis of a unit root is tested using the *t*-statistic for testing $\alpha = 1$ in the following regression

$$y_t = \mu + \theta DU_t + \beta t + \delta D(T_b) + \alpha y_{t-1} + \sum_{i=1}^{k} c_i \Delta y_{t-1} + e_t \qquad (6)$$

where T_b is the time of the break, $DU_t = 1(t > T_b)$ and $D(T_b)_t = 1(t = T_b + 1)$ with 1(.) being the indicator function.

The Mixed Model: This model allows for a break to occur simultaneously in both the intercept and the slope at time T_b. This model is also an innovational outlier model where the change occurs gradually in both the intercept and the slope. This model will be denoted by model IO2. In this model the unit root test is performed using the *t*-statistic for the null hypothesis that $\alpha = 1$ in the following regression

$$y_t = \mu + \theta DU_t + \beta t + \gamma DT_t + \delta D(T_b) + \alpha y_{t-1} + \sum_{i=1}^{k} c_i \Delta y_{t-i} + e_t \qquad (7)$$

where $DT_t = 1(t > T_b)t$.

The Changing Growth Model: In this model only a change in the slope is allowed with both segments of the trend function are joined at the time of the break T_b. Moreover, the change here is supposed to occur rapidly and corresponds to the "additive outlier model" in the terminology of Perron (1989). This model will be denoted by model AO. To test the unit root hypothesis, Perron (1989) uses a two-step procedure. First, the series is detrended using the following regression where $DT = 1(t > T_b)(t - T_b)$

$$y_t = \mu + \beta t + \gamma DT_t^* + \tilde{y}_t. \qquad (8)$$

Then the test is performed using the t-statistic for $\alpha = 1$ in the regression:

$$\tilde{y}_t = \alpha \tilde{y}_{t-1} + \sum_{i=1}^{k} c_i \tilde{y}_{t-i} + e_t. \qquad (9)$$

In order to device unit root tests that have power against the trend break stationary alternative, Perron (1989) first specifies the location of the break-date T_b. Then, given the break-date, he estimates a regression that nests the random walk null and the trend-break stationary

alternative of choice. The assumption that the break date is known a priori was, however, criticized because the choice of T_b is correlated with data, which makes Perron (1989) test reject the unit root null too often (see for example Christiano 1992; Banerjee, Lumsdaine and Stock 1992; Zivot and Andrews (1992), and Perron and Vogelsang 1992).

In order to avoid this bias, some studies have proposed extensions of Perron's (1989) unit root tests where the break-date is endogenously determined: Zivot and Andrews (1992), Banerjee et. al. (1992), Perron and Vogelsand (1992), Perron (1997), and Vogelsand and Perron (1998). These studies have proposed to apply Perron's (1989) methodology for each possible break date in the sample, which yields a sequence of *t*-statistics. Then, using this sequence, a minimum *t*-statistic can be constructed that maximizes evidence against the null hypothesis. Therefore, the availability of the minimum *t*-statistics avoids the need for the a priori knowledge of the break-date.

Although the issue of break-date determination has been resolved, the issue that still remains is how to choose between the three alternatives of the unit root test. That is, how to characterize the form of the break. In this respect, Sen (2003) argues that the selection of the form of the break is also correlated with the data and, therefore, misspecification of the alternative may induce power distortions. He assessed the performance of the minimum *t*-statistics when the form of the break is misspecified. The simulation results of Sen (2003) indicate that the loss of power is minimized when the mixed model specification is used to characterize the form of the break. Therefore, he suggests that practitioners should use the form of the break specified under the mixed model IO2, which is the most general characterization under the alternative, unless prior information suggests using either the crash model IO1 or the changing growth model AO.

Empirical Results

Data and Variables Definitions

In order to allow comparison of our results with those in previous studies dealing with the same issue, we use the same data and the same time period as in Arestis et. al. (2001). The data consists of quarterly series for the Unites States between 1972:2 and 1998:1 and contains real output, a measure of banking system development, three measures of stock market development, and a measure of stock market volatility. Real output is measured by the logarithm of real GDP (*Y*); banking system development is measured by the logarithm of the ratio of domestic bank credit to nominal GDP (*B*). For stock market development, we use three measures. The logarithm of the stock market capitalization ratio (*MC*) defined as the ratio of stock market value to GDP; the logarithm of the stock market transactions to GDP ratio (*TRY*); and the logarithm of the ratio of stock market transactions to stock market valuation (*TRMV*). Stock market volatility (*SMV*) is

measured by a moving eight quarter standard deviation based on the logarithmic first differences of the end-of-quarter stock market price index. The original data are from Datastream International. Data on stock market are end-of-quarter price indices and market values.

Test Results for Unit Roots

In this section we present the results of testing for the existence of unit roots in the series *Y*, *B*, *MC*, *TRY*, *TRMV*, and *SMV*. The unit root tests were performed on the natural logarithm of all variables, except for the stock market volatility. Since the form of the break is unknown, we followed the recommendation of Sen (2003) and used the mixed model IO2 in (8) as the alternative. The choice of the appropriate break date (T_b) and order of the lag-truncation parameter (k) are determined endogenously following Perron (1997), with k-max = 12. In particular, the break-date T_b is selected as the value which minimizes the t-statistic for testing $\alpha = 1$. The truncation lag parameter k is selected using a general-to-specific recursive procedure based on the t-statistic on the coefficient associated with the last lag in the estimated autoregression. That is, the procedure selects the value of k such that the coefficient on the last lag in an autoregression is significant, up to a maximum order k-max.

Table 1. Test Results for Unit Roots

Series	k	T_b	$t_{\hat{\theta}}$	$t_{\hat{\beta}}$	$t_{\hat{\gamma}}$	$t_{\hat{\delta}}$	$\hat{\alpha}$	$t_{\hat{\alpha}}$	*5%*	*1%*
Y	11	1983:1	-1.628	2.174	2.366	1.564	0.784	-3.850	-5.19	-5.86
B	11	1976:4	2.916	2.926	-2.916	-0.249	0.895	-3.816	-5.19	-5.86
SMV	8	1977:2	3.476	3.557	-3.544	-3.485	0.797	-2.861	-5.19	-5.86
MC	3	1982:	-4.083	-2.601	4.208	0.116	0.855	-5.01	-5.19	-5.86

		1								
TRY	0	1978: 2	-2.500	-1.173	2.897	0.585	0.652	-4.797	-5.19	-5.86
TRMV	0	1987: 4	2.571	9.273	-5.311	1.251	0.164	-10.189	-5.19	-5.86

Note: Mixed-model regression: $y_t = \mu + \theta DU_t + \beta t + \gamma DT_t + \delta D(T_b) + \alpha y_{t-1} + \sum_{i=1}^{k} c_i \Delta y_{t-i} + e_t$. T_b is the break date, k is the value of the lag-truncation parameter chosen according to the Perron (1997) procedure with k-max = 12.

For each series, table 1 reports the truncation lag k, the estimated break date (T_b), and the t-statistics of the parameters in equation (8). The last three columns report the unit root test statistics and critical values. The results of table 1 indicate that, except for *TRMV*, the unit root hypothesis cannot be rejected. Additional testing indicates that these variables are I(1) processes rather than I(2). For *TRMV*, the unit root hypothesis is rejected in favor of a trend stationary process.

Test Results for Cointegration and Long-run Causality

Using the information on the break dates estimated above, we include shift dummies in the deterministic part of VAR in order to take into account the effects of structural breaks on the parameter estimates and, hence, guarantee the stability of the system.

Next, and before testing for cointegration, it is important to carefully determine the lag-length of the VAR model in (1). As the burgeoning literature attests, this is a very important issue because the results of the Johansen cointegration tests are very sensitive to the choice of the lag-length in finite samples. In addition, an overestimation or underestimation of the lag length may result in spurious causality or spurious absence of causality. Cheung and Lai (1993) have examined the robustness of the Johansen's cointegration test to the lag-length specification. They reported that The Johansen test is biased towards finding cointegration more often than implied by the asymptotic theory. This bias increases with the dimension of the estimated system and the lag length. These findings accord with those of Gonzalo (1994) whose results emphasize the importance of accurate determination of the lag-length. In this application we used both the Final Prediction Error (FPE) criterion and the Schwartz (SC) criterion and selected $k = 3$ when either *TRY* or *TRMV* are used and $k = 5$ when *MC* is used in VAR. Using this lag-lengths, we tested for up to the tenth order serial correlation and for normality in the residuals of the VAR equations.

The results of these tests, which are not reported here, show that these lags left the residuals approximately identically normally distributed.

Finally, in order to use the appropriate specification of VAR, we select the appropriate deterministic components that should be included in VAR besides the dummy variables. We do this using the Johansen (1994) procedure described above. Using the trace statistic, the appropriate specification that we select is the one which allows for deterministic trends in the variables with an intercept in the cointegration space. This choice seems to be consistent with the results of the unit root tests conducted above, which clearly show the existence of trends in the data. Moreover, as shown below, the intercept tem turns out to be significant in the cointegration space irrespective of the measure we use for stock market development. Thus, depending on the measure used for stock market development, the specification of VAR that we retain is the one with three or five lags, dummy variables to account for structural change, deterministic trends in the level variables, and an intercept in the cointegration space. Using this specification, we now test for cointegration between the variables using different measures of the stock market development. Table 2 below reports the Johansen trace and λ_{max} statistics along with their 90% critical values. Table 3 reports the corresponding cointegrating vectors and the adjustment coefficients. As mentioned above, long-run Granger causality is tested based on the significance of the adjustment coefficients of the variables.

The first part of table 2 reports the results of testing for cointegration using *TRMV* as a measure of stock market development. In this test *TRMV* was treated as weakly exogenous because it is an I(0) variable. In this case, the results of cointegration indicate the existence of two cointegrating vectors. These cointegrating vectors and the adjustment coefficients of the variables are reported in table 3a below. From the first cointegrating vector, which is normalized on *SMV*, we can see that *Y* and *TRMV* are significant. In the second cointegrating vector, which is normalized on *Y*, we can see that *TRMV* and *SMV* are significant. In addition, from the α vectors, we can see that *Y* is adjusting to both vectors, *B* is adjusting to the first vector, and *SMV* is adjusting to both vectors. Therefore, in light of these results, we are now able to make the following conclusions about the flow of long-run causality between the variables: (i) there is a one way long-run causality running from stock market development to economic growth; (ii) there is a long-run causality running in both ways between stock market volatility and economic growth; (iii) there is a one way long-run causality running from economic growth to banking development; (iv) there is a long-run causality running in one way from stock market volatility to banking development; (v) there is a long-run causality running in one way from stock market development to banking development; and (vi) there is a one way long-run causality running from stock market development to stock market volatility.

The second part of table 2 reports the results of cointegration when *TRY* is used as a measure of stock market development. In this case there are also two cointegrating vectors. These vectors and the adjustment coefficients of the variables are reported in table 3b. The first cointegrating vector is normalized on *SMV* and indicates that only *Y* and *TRY* are significant. The second cointegrating vector is normalized on *Y* and indicates that only *SMV* and *TRY* are

significant. Thus, in this case too, *B* is not in the cointegration space. On the other hand, looking at the adjustment coefficients we can see that *Y* and *B* are adjusting to the second cointegrating vector, *SMV* is adjusting to the first one, while *TRY* is not adjusting to either vector. Thus, in this case too, stock market development seems to be weakly exogenous, while *Y*, *B*, and *SMV* are adjusting to the long-run equilibrium. In light of these results, the implications regarding the flow of long-run causality between the variables are the same as in (i) - (vi) above.

The last part of table 2 reports the results of cointegration between the variables when *MC* is used as a measure of stock market development. In this case, there are three cointegrating vectors. These vectors and the adjustment coefficients of the variables are reported in table 3c. The cointegrating vectors are normalized on *B*, *Y*, and *SMV*, respectively. In these vectors we can see that all variables enter significantly the cointegration space. Moreover, we can see that *Y*, *B*, and *SMV* are adjusting to two vectors, while *MC* is adjusting to all three vectors together. Thus, in this case, we can safely conclude that long-run causality is running in both ways between the four variables in the system. In particular, and in contrast with the first two cases, long-run causality here is running in both ways between economic growth and financial development, where the later is measured by either banking development or stock market development.

Table 2. Test Results for Cointegration

Trace				λ_{max}				
H_0	H_1	Stat.	90%	H_0	H_1	Stat.	90%	λ
Variables in VAR: *Y, B, SMV, TRMV* (*TRMV* weakly exogenous)								
$r = 0$	$r \geq 1$	70.47	31.88	$r = 0$	$r = 1$	38.19	14.09	0.328
$r \leq 1$	$r \geq 2$	32.28	17.79	$r \leq 1$	$r = 2$	26.28	10.29	0.239
$r \leq 2$	$r \geq 3$	6.00	7.50	$r \leq 2$	$r = 3$	6.00	7.50	0.061
Variables in VAR: *Y, B, SMV, TRY*								
$r = 0$	$r \geq 1$	83.78	49.92	$r = 0$	$r = 1$	42.36	18.03	0.357
$r \leq 1$	$r \geq 2$	41.43	31.88	$r \leq 1$	$r = 2$	29.70	14.09	0.266
$r \leq 2$	$r \geq 3$	11.73	17.79	$r \leq 2$	$r = 3$	9.23	10.29	0.092
$r \leq 3$	$r \geq 4$	2.49	7.50	$r \leq 3$	$r = 4$	2.49	7.50	0.026
Variables in VAR: *Y, B, SMV, MC*								

$r = 0$	$r \geq 1$	94.74	49.92	$r = 0$	$r = 1$	47.39	18.03	0.399
$r \leq 1$	$r \geq 2$	47.35	31.88	$r \leq 1$	$r = 2$	21.89	14.09	0.210
$r \leq 2$	$r \geq 3$	25.46	17.79	$r \leq 2$	$r = 3$	18.60	10.29	0.181
$r \leq 3$	$r \geq 4$	6.86	7.50	$r \leq 3$	$r = 4$	6.86	7.50	0.071

Notes: variables are as defined in the text. The first part of the table tests for cointegration between *Y*, *B*, *SMV* and *TRMV*. Since *TRMV* was found stationary, it was treated as weakly exogenous. The VAR specification used to test for cointegration has three lags and includes shift dummies in the deterministic part to account for structural breaks. The second part of the table tests for cointegration between *Y*, *B*, *SMV* and *TRY*. The VAR specification used has three lags and includes shift dummies in the deterministic part to account for structural breaks. The last part of the table tests for cointegration between *Y*, *B*, *SMV* and *MC*. The VAR used has 5 lags and includes the same dummies in the deterministic part. All three models allow for linear deterministic trends in the data, intercepts in the cointegrating vectors.

Table 3a. Test Results for Long-run Causality (stock market development used: *TRMV)*

	Y	B	SMV	TRMV	Intercept
The cointegrating vectors					
C_1	-0.039	-0.177	1	0.018	0.182
	(-2.987)	(-1.401)		(2.115)	(2.273)
C_2	1	0.514	3.227	-0.313	-7.115
		(1.306)	(2.972)	(-22.703)	(-91.286)
The α vectors					
α_1	0.101	0.133	-0.222		
	(2.131)	(2.238)	(-4.884)		
α_2	-0.035	-0.012	-0.037		
	(-3.435)	(-0.947)	(-3.820)		

Table 3b. Test Results for Long-run Causality (stock market development used: *TRY)*

	Y	B	SMV	TRY	Intercept
The cointegrating vectors					
C_1	0.218	-0.049	1	-0.041	-1.757
	(3.656)	(-1.501)		(-3.705)	(-3.879)
C_2	1	0.586	-0.855	-0.210	-7.637
		(0.485)	(-3.654)	(-34.322)	(-194.024)
The α vectors					
α_1	-0.075	0.045	-0.386	0.670	
	(-1.279)	(0.591)	(-7.229)	(0.542)	
α_2	-0.049	-0.029	0.006	-0.091	
	(-4.069)	(-1.908)	(0.509)	(-0.364)	

Table 3c. Test Results for Long-run Causality (stock market development used: *MC)*

	Y	B	SMV	MC	Intercept
The cointegrating vectors					
C_1	-0.130	1	-4.315	0.055	1.581
	(-2.665)		(-2.769)	(2.810)	(2.281)
C_2	1	1.266	-33.103	-0.742	-8.770
		(2.664)	(-2.102)	(-15.827)	(-140.167)
C_3	0.400	-0.118	1	-0.137	-3.610
	(2.102)	(-2.737)		(-2.722)	(-2.492)
The α vectors					
α_1	-0.008	-0.061	0.060	0.340	
	(-0.450)	(-3.557)	(3.592)	(2.245)	
α_2	-0.005	0.003	0.001	-0.024	

	(-4.449)	(3.303)	(0.938)	(-2.727)
α_3	-0.056	0.005	-0.090	0.468
	(-2.000)	(0.168)	(-3.323)	(1.961)

Notes: Figures in parentheses are the *t*-ratios.

Diagnostic Checking

In order to check the validity of our results, we herein use some diagnostic tests to check the stability of the estimated parameters. Although we have incorporated shift dummied to account for the presence of breaks in the data, it is important to check and make sure that the estimated long-run relationships and the long-run causality tests are stable.

To this end, we herein use the rank stability tests and estimate the models recursively as suggested by Hansen and Johansen (1993, 1998). This testing procedure involves estimating the cointegrating vectors using the full sample and then test whether the full sample results are stable when the models are estimated over the recursive subsample. These tests are conducted using the following LR test, which has a $\lambda^2(2)$ distribution

$$LR = T\sum_{i=1}^{q}\ln(1-\lambda_i) - T_j\sum_{i=1}^{q_1}(1-\lambda_{1i}) \quad (10)$$

where λ and λ_1 are the full and recursive sample estimates of the eigenvalues of the long-run parameter matrix $\prod$. The starting date of recursive estimation is indicated by the subscript *j* such that

$T_j = T_1 + 1, T_1 + 2, \ldots, T.$

Table 4 reports the results of the recursive estimation and the rank stability tests. Due to sample size considerations, the starting year for recursive estimation is chosen to be 1990:4 for each one of the three measures of stock market development. The results in this table prove that the rank of the long-run parameter matrix and the long-run relationships are stable.

Table 4. Diagnostic Checking: Recursive Stability Tests

Sample:	*Eigenvalues*				*Rank Stability Test*
1973:1 -	λ_1	λ_2	λ_3	λ_4	

Stock market development used: TRMV					
1990:4	o.425	0.340	0.122		5.774
1991:4	0.420	0.310	0.111		5.102
1992:4	0.417	0.300	0.081		5.101
1993:4	0.400	0.280	0.075		3.697
1994:4	0.385	0.268	0.072		3.454
1995:4	0.370	0.250	0.068		2.097
1996:4	0.355	0.245	0.063		1.968
1997:4	0.328	0.239	0.061		Full Sample
Stock marker development used: TRY					
1990:4	0.435	0.375	0.163	0.051	4.156
1991:4	0.415	0.356	0.158	0.040	2.993
1992:4	0.402	0.336	0.146	0.037	2.041
1993:4	0.390	0.317	0.138	0.034	1.555
1994:4	0.381	0.305	0.127	0.030	1.489
1995:4	0.375	0.285	0.120	0.029	1.201
1996:4	0.370	0.268	0.111	0.027	0.857
1997:4	0.357	0.266	0.092	0.026	Full sample
Stock market development used: MC					
1990:4	0.453	0.371	0.248	0.111	3.992
1991:4	0.441	0.350	0.232	0.102	3.359
1992:4	0.436	0.315	0.225	0.093	2.463
1993:4	0.415	0.311	0.211	0.085	1.876
1994:4	0.407	0.295	0.201	0.072	1.248

1995:4	0.403	0.271	0.193	0.070	1.121
1996:4	0.400	0.242	0.183	0.073	0.498
1997:4	0.399	0.210	0.181	0.071	Full Sample

Notes: λ_1 - λ_4 are the eigenvalues estimates recursively. The rank stability test is computed according to (10). In each case the starting recursion date is 1990:4.

Conclusion

This paper uses recent time series techniques to investigate the role of the US stock market in promoting economic growth and development. Past empirical attempts using time series techniques failed to find any causal link between the US stock market and economic growth due mainly to misspecification.

Using the recently developed unit root tests, we were able to estimate the different structural breaks as well as the appropriate order of integration in the data. Moreover, using the Johansen (1994) sequential procedure, we were able to identify the correct specification of the deterministic components of the model. These findings were incorporated in a VEC model that we used to test for the existence and direction of long-run causality between stock market development and economic growth, after controlling for the effects of banking development and stock market volatility.

In particular, the evidence presented here lends strong support to the view that capital market development is an engine to output growth in the US. In addition, these results are robust to the measure of stock market development used. Thus, the evidence presented here closes a wide gap in the empirical literature and sheds light on the unambiguous role played by the US stock market in driving real economic activity.

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CORPORATE RESTRUCTURING AND AGENCY THEORY

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Abstract

This paper examines corporate restructuring in relation agency theory, as managers often undertake their restructuring too late to benefit them (self interest) or for stockholders. They often choose to engage in back-to-the-wall defensive "financial" restructuring. Our analysis shows such late efforts to be futile. Moreover, they are wasteful of company resources and stakeholder goodwill. On the one hand, this research shows proactive "organizational" restructuring to be value-creating. On the other hand, corporate restructuring involving real organizational changes were found to be more effective then defensive restructurings enhancing corporate performance. Thus, a historical perspective of restructuring offers an insight into present day management practices.

Keywords
Corporate Restructuring, Agency Theory, Organizational Restructuring, Shareholders

Introduction

The proposed definition of corporate restructuring has several characteristics. First, the impact of corporate restructuring is "corporate wide" and felt beyond the functional or departmental levels. Second, the "frame-breaking" nature of restructuring suggests radical change (Lewin, 2000) in any or all of its on-going strategies, structures and processes, in contrast to the frame-bending change associated with the incremental change (Thomsen, 2004; Mardjono, 2005).

In order to understand the nature of corporate restructuring in the 1990's, it is necessary to examine the management philosophies of the years prior to the 80s, and forces that compelled firms to change their course in the 90's. Past trends in late corporate planning suggest that in the

50's and the 60's, formal budgeting and long-range planning emerged as major forces in shaping organizations in response to war-time shortages during the WW II. A shortage economy forced firms to install formal budgeting and think towards the future resulting in annual budgets extending into long-range plans. It involved developing forecasts of requirements, acquisition and utilization of resources under resource shortage conditions. Such planning, therefore, focused more on organizational capabilities to acquire resources than on competitiveness in a supplier's market. It lead to the functional and geographical divisionalization becoming a norm for structuring organizations (Heitman, 1993).

In the late 70's and the 80's, portfolio planning emerged in response to increasing environmental turbulence and uncertainty. The underlying philosophy of this planning approach was that a collection of unrelated and countercyclical businesses could be so structured as to stabilize cash flow and earnings growth (Tricker & Wong, 2002). Businesses were acquired and managed primarily on the basis of their projected cash flows, rather than on the basis of their operational or product-market synergies and competitiveness. The logic of portfolio planning often led firms to opt for conglomeration achieved through unbridled diversification, creating a potpourri of unrelated businesses. It also led firms to focus on short-term performance measures such quarterly earnings even at the cost of long-term competitiveness. More importance was given to internal portfolio concerns rather than to the customer or product-market concerns. Additionaly, the notion that business units as a whole are not conglomerate, was forgotten (Abor & Adjasi, 2007). A conglomerate structure based on the firm acting as an internal capital market based governance structure (Dietl, H. 2005) became the norm for building corporations.

The Business Environment in the 1990s

In the 1990's, businesses experienced volatile changes in competition and capital markets. Deregulated and relaxation of Anti-Trust laws, an increasing rate of technological innovations and shorter industry and product-market life cycles reducing time available to recoup investments, increasing foreign competition, the information revolution resulting from widespread use of computer and telecommunication technologies changed the nature of competition. Dramatic changes also took place in the capital markets. The norms of capital structure changed drastically as increasing use of junk bonds and incidence of leveraged buyouts increased corporate debt substantially (Smith & Walter, 2005). The easing of the norms of borrowing and the easier access to capital, In turn, made it possible for outsiders to acquire control of firms.

The changes in the nature of competition and capital markets forced corporations to change the way they operate and compete from an internal focus on portfolio considerations in the 1970's and 1980's to an externally oriented competitive focus in the 1990's. The arguments for a multi product conglomerate organization based on the governance concept (Connelly, *et al* 2007: Bonazzi, *et al* 2007) became questionable in an era of highly volatile environment. Therefore, corporate restructuring often became necessary to undo the unbridled diversification strategies of the 80's.

In the first part of the paper, the historical context under which restructuring has become necessary is examined. In its second part, a conceptual framework is developed. This leads to the criteria for evaluating restructuring alternatives delineated in the third section. In the fourth section, the model outlining the late restructuring process is proposed. This followed by conclusions.

Statement of the Problem

Agents (seeking of self-interest) undertake late corporate restructuring to eliminate the lack of cumulative excess return. Agents do that in order to gain more power. However; waiting too long is not going produce positive results for the company.

Purpose of the Study

This study will examine the issues of late restructuring and how top management use it to adjust the problems they have.

Research Questions

- Does corporate restructuring reduces the lack of cumulative excess return.
- Does defensive restructuring increase the negative value gap for restructuring firm.
- Does organizational restructuring reduce negative value gap for restructuring firm.

Conceptual Framework

In developing the conceptual framework to examine the underlying stimuli of the restructuring in the 1990's, we draw upon the roles of efficient market, value gap and corporate governance. Criteria likely to play crucial role in choice of different corporate restructuring strategies by incumbent management are also evaluated.

Preliminary Hypotheses:

1- Late Corporate restructuring may not help firm to eliminate a negative value gap
2- Defensive restructuring may not increase the negative value gap for the restructuring firm.
3- Organizational restructuring may not reduce negative value gap for the restructuring firm.

Rational/ Importance:

The study proposes a two-phase process model of restructuring. The first phase involves retrenchment through late divestitures, liquidations, and late employee layoffs, tightly knitting the firm around a central theme or core competence. In the second phase, the firm focuses on strategic acquisitions or joint ventures. Additionally, this paper proposes a conceptual framework explaining the dynamics and motives of corporate restructuring. For the purpose of this paper,

corporate restructuring is defined as: "an enduring and frame-breaking change in any or all of a corporation's ongoing structures or processes having corporate wide impact with substantial implications for is stakeholders."

Literature Review

Efficient Market Hypothesis and Value Gap

Smith and Walter (2005) reviewed the theoretical and empirical literatures on capital markets and concluded that capital markets are basically efficient, i.e. stock prices "fully" reflect all available market information (e.g. announcement of annual earnings, stock splits, etc.) under the assumption that no investors have monopolistic information. This assumption is further strengthened by the fact that in that in the 1990's, with advent of computer based program trading; stock markets developed the ability to react with blinding speed to new information. Coupled with stricter laws on insider trading violations, SEC crackdowns have further enhanced the efficiency of the stock markets. This is turn questions Dietl's (2005) propositions that internal capital markets are more efficient than the external markets. This assertion subscribes to the view that the stock price of a firm in an efficient market is a reliable barometer for evaluating that firm's performance and market value.

However, market value is only one measure of a corporation's value. Helfert (1996), Lewin, (2000), and Fahy, et al (2005) have suggested techniques of shareholders value analysis which compare the market value with values derived from other perspectives. For example, Helfert (1996) suggests "as is", "potential" and "external" valuations based on discounted stream of future earnings using either the investor's required rate of return or the corporation's cost of capital. SVA leads to potential optimal values that the corporation's cost of capital. SVA leads to potential optimal values that the corporation can realize with changes in its current strategies, structures and /or processes.

Negative value gap arise when shareholder value analysis reveals that optimal values is not attained by a firm. For example, a negative value gap will exist when any of the Murrin's "as is" , "potential" or "external" values exceed that market value determined by the open market. Positive and negative value gap are defined.

Corporate Governance

According to the concept of Corporate Governance, the shareholders of a firm contracts "the rights to determine the management of corporate resources" to a management team (Bonazzi & Islam, 2007). Different management teams put together by insiders such as labor unions and outsiders such as corporate raiders compete with the incumbent management team for the control of the assets of the firm. An efficient market evaluates competing offers of these management teams. The stockholders simply confer the rights of managing the assets of their firm to the management teams offering them the best value. Therefore, competition for the rights

to mange resources through market for corporate control prevents the incumbent management from diverging from the objective of shareholder wealth maximization (Douglas, 2007).

Stimuli for Corporate Restructuring

Forces stimulating corporate restructuring arise in presence of a negative value gap. In an era instantaneous information flow, negative value gap will show-up on the computer screens of takeover and arbitrage specialists. The market for corporate control ensures that outside management teams will seek to exploit those value-gaps through takeover bids, friendly, or otherwise threatening the continued control and tenure of the incumbent management. Under such circumstances, the incumbent management has the opportunity to undertake operational or strategic measures to eliminate the negative value gap. The firms likely to take measures on their own initiative are likely to be Innovative types (Braun & Latham, 2007; Fahy, *et al* 2005). Failure by the incumbent management to take appropriate measures would compel their shareholders to engage another management team. Thus, in the presence of a negative value gap, the market for corporate control stimulates restructuring. Hence, the rejection form of the hypothesis may state as:

Proposition 1: Firms subject to late corporate restructuring do not have a negative value gap.

Hypothesis 1: U.S. firms subject to late corporate restructuring do not have a negative value gap.

Modes of Corporate Restructuring

Since corporate restructuring is a major event for a company, it is often traumatic event for its stakeholders. The top managers would, therefore, prefer restructuring mode that reduces the trauma for themselves and the stakeholders. Accordingly, an important criterion for choosing restructuring strategy would be the degree to which it offers higher control over the restructuring process and lower uncertainty of the outcomes so that the incumbent management can modify or even reverse decisions if necessary if necessary (Allen, 1979). A strategy relying principally on organizational resources directly under the control of the incumbent management provides the managers with a higher degree of control over the restructuring employing such resources. Such strategy may be termed as organizational restructuring.

Organizational restructuring utilizing internal resources is undertaken when internal organizational inefficiencies are identified. For example, the firm may be squandering its managerial and financial resources on sustaining marginal businesses while neglecting its core value-creating businesses. This mismanagement of resources, reflected in a negative value gap, may be easy to correct. Organizational restructuring involving such actions as retrenchment, late spin-offs and liquidations and late divestitures are directed at internal inefficiencies of the corporation. While related acquisitions, mergers and joint ventures, and internal corporate venturing redirects the organizational resources to enhance competitiveness of the firm. Such

steps are positively rewarded by the stock market. Hence, in a rejection form the proposition may be stated as:

Proposition 2: Organizational restructuring is unable reduce or eliminate negative value gap for the restructuring firms.

Hypothesis 2: U.S. firms subject to organizational restructuring are unable to reduce or eliminate negative value gap.

However, there may be two situations under which the stimuli to undertake organizational restructuring may be suppressed. The first may involve a scenario where the firm is being threatened with a takeover that is hostile to the incumbent management. The incumbents may be left with no resources but to undertake a defensive action. The second involves a scenario where the incumbent managers are powerful enough to conspire to entrench their position, even , and the cost of shareholder interests (Jensen, 1989; Dann and DeAngelo, 1988). They may restrict the power of the shareholders by instituting defensive poison pills such as dual class stocks with different voting rights, golden parachutes, staggered board elections; measures which act as a barrier to a takeover. Since the defensive and financial measures are undertaken by the incumbents for protecting their own interest, the organizational factors responsible negative value gap may not be addressed and, in fact, may be harmful to the firm and its shareholders. Hence, in rejection form, the hypothesis my be stated as:

Proposition 3: Defensive restructuring does not reduce the negative value gap for the restructuring firms

Hypothesis 3: U.S. firms subject to defensive restructuring are unable to reduce the negative value gap.

The argument thus suggests that restructuring undertake by an incumbent management not having to resort to defensive actions would be more successful at enhancing shareholder wealth. Moreover, when an incumbent management decides to restructure on its own accord, it has the luxury of time to fully evaluate alternatives and obtain the necessary resources under most advantageous terms

Measure Excess Returns

Researchers in strategic management have used market measures to evaluate corporate performance. Market measures have been shown to be superior to accounting-based or hybrid measures (price, earnings) which incorporate both accounting as well as market measures in evaluating firm performance or value (Lubatkin & Shreives, 1986). Since it is not possible to measure the negative value gap directly, we use excess returns available from the CRSP tapes (for details of excess returns calculation see the CRSP manual, 1989, pages 31-32), to determine the existence of a negative value gap under the assumption that the stock market is efficient (Fama, 1970). The advantage of using excess returns is that its calculation compares a firm's stock returns with that of a market portfolio comprising of firms facing a similar level of systematic risks.

Thus defined, excess returns may be considered as a direct measure of the market valuation of a firm. Positive excess returns indicate that the firm's stock returns are above that of the market portfolio, and there from that the firm's performance is seen in a positive light. Negative excess returns indicate that the firm's stock returns are below the market portfolio and there from the presence of a negative value gap and that the firm's performance was considered to be poor.

The problem facing researchers is to determine exactly when the investor knows all restructuring-related information. Studies in finance journals have tended to define this timeframe as the announcement day plus trading day preceding it. Studies in management journals have argued that the two-day announcement effect may not capture the full impact of an event (Lubatkin and Shrieves, 1986). In this study, therefore, excess returns are cumulated over a longer time horizon. A two-year window is chosen for this study: excess returns were complied for a period of one year (comprising of 253 trading days) prior to and one year after the restructuring announcement.

Analysis

This study utilized list of firms which had undertaken corporate restructuring between 1993 and 1999 were identified from announcements and news items in the Wall Street Journal. 37 Firms have announced late restructuring during that time period. The sample was divided into two groups: one with 19 firms had undertaken late defensive restructuring, and the second with 18 firms had undertaken organizational restructurings. For the firm in the sample, the average annual sales were $4.2 billion and the average number of employees-36,000.

For each sample, the excess returns of the firms are first cumulated by each day and a mean return is calculated for each day. Beginning with the first day of each time frame, the sample mean is cumulated for every successive day and plotted against days as "Cumulated excess returns line" (CERL) . One set of regression trend is based on the returns cumulated over day-1 to day 252 prior to restructuring announcement day for testing H1O. The second set of regression trends used cumulated returns from day 253 to day506 after the restructuring announcement day to test H2O and H3O. The zero line – the market portfolio returns—indicates the potential returns that each firm should earn given its risk class. A regression of their chronological trend was undertaken to determine the significance of differences between the CERL and the market portfolio returns line. If the market valuation is average or the same as that of the market portfolio, the random fluctuations of excess returns over the mean or the market average should cancel out each other when cumulated over time (or day). If the firms are consistently undervalued by the market, then CERL should exhibit a negative downward-sloping trend over time. If excess returns are positive, the CERL should be upward-sloping. The trend exhibited by the CERL is evaluated from its slope and the t- value.

Results

We accept the alternate of hypothesis H1O which for the combined sample of 37 firms suffered from a negative value gap prior to restructuring. The regression analysis shows a t-value of 294.46. The results show that the mean value of the excess returns was –0.065 prior to restructuring. Further support for the hypothesis is provided by the sample split-up into the groups. Firms undertaking defensive restructuring has a mean excess return of –0.075, while for firms undertaking organizational restructuring had a mean excess returns of –0.054 (Table 1).

We accept the alternate of hypothesis H2 O that organizational restructuring was effective in terms of reducing or eliminating negative value gap. This is statistically supported with a t-value of 209.9 and a positive mean value of 0.026 for the cumulated excess returns. We also, accept the alternate of hypothesis H3 O that defensive restructurings further increased the negative value gap. It is statistically supported with a t-value 180.2 and a negative mean value of 0.023 for the cumulated excess returns.

The results provide strong evidence that negative value gaps may be a primary stimulus for corporate restructuring. Managements which were fortunate of not having to face a direct threat to their control were often in a position to undertake preemptive organizational restructurings that could improve competitiveness and reduce negative value gaps. However; that managements which undertook defensive financial restructuring to protect their tenure destroyed shareholders wealth and value for their firms as they were not directed at root causes of organizational inefficiencies. Integrating the results of this study and the historical trends in corporate planning, we propose a framework for explaining the restructuring trend.

Corporate Restructuring: A Process Model

Corporate restructuring is co-produced by the self-interest of top managers and the presence of a negative value gap. Negative value gaps resulted from the misalignment of portfolio based on planning of the ’60 and the ’70 and the changed business conditions of the ‘80s. late restructuring became necessary for realignment. A proactive and alert incumbent management team may initiate restructuring on its own. They were in a position to undertake late defensive financial as well as late organizational restructuring. Under the latter option, a well designed and executed late corporate restructuring preempted the development of organizational misalignment and negative value gap. This ensured continued tenure for the incumbent management.

However, firms which failed to initiate a corrective late restructuring were often targets of corporate raiders. Under such circumstances, the incumbent managements—with an agenda of protecting their own interest often undertook defensive, financial late restructuring that were often destructive in the long -run. This perspective on late restructuring explains the vexing puzzle of the American economy of eighties whereby a frantic pace of corporate struggles resulted in some firm coming out ahead while others weakened their competitive even resulting self-destructing themselves.

The firms which undertook late organizational restructuring and successfully adapted to the changing competitive environment have opened doors for a new kind of expansion, both

focused and global, to replace the older conglomerate mode. Resources freed up from marginal operations became available after late restructuring could not be used to shore-up core businesses but could also used to undertake focused expansion. As presented in Section 1, major expansions became feasible in the domestic sector after the relaxation of the antitrust laws and deregulation by the Reagan administration in the '80, and in the foreign sector due to the opening up of the economies in Europe and Pacific Asia. Moreover, this is also facilitated by an increasingly sophisticated market for takeovers and acquisitions. Hence, such firms are in a position to capture new grounds that weaker firms are likely to loss in a highly globally competitive market place.

Conclusion

Corporate restructurings are likely to further intensify and increase in the 2000's. So far, there has been a little research on this important corporate activity. This research proposal synthesized a present model of the historical evolution of the corporate restructuring activity. The model identifies negative value gaps and the threat of corporate takeover as stimuli leading to late restructuring of the 90's. It examines the critical role of the incumbent management in its likely outcomes. Corporate restructuring involving real organizational changes were found to be effective then defensive restructurings enhancing corporate performance. Thus, a historical perspective of restructuring offers an insight into present day management practices.

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Cointegration, Structural Changes and the Relationship between Trade and Economic Growth in Tunisia

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Abstract

This paper examines the major determinants of GDP growth in Tunisia using quarterly time series data spanning from 1960 to 2003. The Tunisian economy has been subject to a multitude of structural changes and regime shifts during the sample period. Thus, time series properties of the data are first analyzed by Zivot-Andrews (1992) model. The empirical results based on this model indicate the presence of unit roots for all of the variables under investigation. Taking into account the resulting endogenously determined structural breaks; the Saikkonen and Luetkephol (2000) and Johansen and al (2001) cointegration approach is then employed to determine the long-run drivers of economic growth. This cointegration technique accommodates potential structural breaks that could undermine the existence of a long-run relationship between GDP growth and its main determinants. Empirical estimates based on Quintos (1995) and Johansen (1993) approches indicate that in the long-term, policies aimed at promoting various types of physical investment, human capital, trade openness and technological innovations will improve economic growth.

Keywords

Structural Break, Unit Root Tests, Cointegration technique, Trade and Tunisian Economic Growth

Introduction

Feder (1982), Balassa (1985) and Ghatak et al. (1997) suggested that export expansion might generate positive externality through more efficient allocation of resources, efficient management and improved production techniques, specialization, competition and the economy of scale. Hence various development theories have emerged in the literature suggesting that export expansion further accelerates economic growth due to the above-mentioned factors. This is referred to as the export-led growth (ELG) hypothesis. Endogenous growth models make use

of the same idea to analyze the broad externality effects of exports on the economy, but they address the role of imports as well. These models emphasize the fact that trade works as a conduit of knowledge spillover. In turn, this knowledge spillover enables the economy to achieve increasing returns, and human capital also has a role in increasing economic growth through the same knowledge spillover effect of trade (Sengupta, 1993). In fact, according to the endogenous growth theory factors such as: physical capital (R&D effects), human capital (representing knowledge spillover effects), exports expansion (proxying positive externality effects), and capital and intermediate imports (capturing learning-by-doing effects) are the major determiners of economic growth.

Following empirical studies of the sources of growth by such researchers as Ram(1987), Sengupta (1993), Van Den Berg (1997), and Ibrahim and MacPhee (2003) and which have followed the Feder (1982) model, we include export in the typical production function. In addition, like Ven Den Berg, we include total imports as a new factor in the production function.
The structure of the rest of the paper is as follows. Section II presents the review of the literature. The model, data and methodology are presented in section III. We explains first unit root test based on the Zivot-Andrews (1992) model, which take into account the existence of potential structural breaks in the data and second cointegration analysis in the presence of pre-determined structural breaks using the Saikkonen and Lutkephol (2002) and Johansen and al(2001) cointegration test and the Quintos (1995)and Johansen (1993) VECM estimation approach. Finally, section IV presents the empirical results and the economic interpretations. We ended this paper with some concluding remarks.

Review of the Literature

M. Dritsaki, C. Dritsaki and A. Adamopoulos (2004) investigated the relationship between Trade, Foreign Direct Investment (FDI) and economic growth for Greece over the period 1960-2002. Their methodology is based on VAR model and the cointegration approch. The Cointegration analysis suggested that there is a long-run equilibrium relationship. The results of Granger causality test showed that there is a causal relationship between the examined variables.
F. Abou-Stait (2005) examined the export-led growth (ELG) paradigm for Egypt, using historical data from 1977 to 2003. During this period, Egypt changed its economic philosophy from central planning and government intervention to one based on a free market economy. The paper employs a variety of analytical tools, including cointegration analysis, Granger causality tests, and unit root tests, coupled with vector auto regression (VAR) and impulse response function (IRF) analyses. The paper sets three hypotheses for testing the ELG paradigm for Egypt, (i) whether GDP, exports and imports are cointegrated, (ii) whether exports Granger cause growth, (iii) whether exports Granger cause investment. The paper fails to reject the first two hypotheses, while it fails to accept that exports Granger cause investment. In addition to the analysis of the 1977-2003 period, the paper looks briefly also at the impact of the economic reform undertaken in 1991, and weather the ELG hypothesis still holds during the 1991-2003 sub-period.

A. Abdulai and P. Jaquet (2OO2) examined the short- and long-run relationship between economic growth, exports, real investments and labor force for Cote d'Ivoire for the period 1961-97, using cointegration and error correction techniques. The results indicate that there is one long-run equilibrium relationship among the four variables, and the causal relationship flows from the growth in exports to the growth in GDP both in the short and long run, providing support for the export-led growth hypothesis. This finding suggests that the recent trade reforms aimed at promoting domestic investment and restoring international competitiveness to expand and diversify exports have the potential of increasing economic growth in the future. The same work is made by J. Balaguer and M. Cantavella-Jordá (2002) on Spanish data base during 1961-2000 periods and by E.M. Ekanayake (1999) on Asiatic countries data base (India, Indonesia, Korea, Pakistan, Philippines, Sri Lanka and Thailand) during 1960-1997 period.

Data model and methodology

Data and model

In this paper, we propose a framework based on the conventional neo-classical one-sector aggregate production technology where we treat capital, labor, total imports and total exports as separate inputs to.
That is:

$$Y = F(K, L, X, M)$$

This model is a kind of production function, which is augmented by the addition of trade factors, exports (X) and imports (M). It should be noted that in Feder-type models, GDP is considered to be simply a function of ordinary labor force growth together with other relevant factors. We follow the endogenous growth theory and consider instead, human capital (the number of employed workforce with a university degree) rather than the total labor force in our empirical models. The following modified model in logarithm form is used to examine the trade-growth nexus in developing economy like Tunisia:

$$Ln(Y_t) = \beta_0 + \beta_1 Ln(K_t) + \beta_2 Ln(L_t) + \beta_3 Ln(X_t) + \beta_4 Ln(M_t) + \varepsilon_t$$

Where Y = aggregate output or real GDP, K is the capital stock, L is the level of employment, M is a total imports, X is the total exports and the subscript t denotes the time period. The data are collected from the WDI CD-ROM, and the International Financial Statistics (IFS).

Methodology

We start our empirical analysis by unit root test based on the Zivot-Andrews (1992) model, which take into account the existence of potential structural breaks in the data. Then we discus the results of cointegration analysis in the presence of pre-determined structural breaks. First we test for cointégration using Saikkonen and Lütkepohl (2000a) and Johansen and al (2001) procedures. Second we estimate the VEC model using the Quintos (1995) and Johansen (1993) approaches.

Unit Roots Tests with Structural Break

The issue of structural break is of considerable importance in the analysis of macroeconomic time series. Such breaks occur in many time series for any number of reasons and this makes it difficult to test the null hypothesis of structural stability against the alternative of a one-time structural break. When present in the data generating process, but not allowed for in the specification of an econometric model, results may be biased towards the erroneous non rejection of the non-stationary hypothesis (Perron 1989; Perron 1997; Leybourne and Newbold (2003). Perron (1989, 1994, 1997) and Zivot-Andrews (1992) attempt to overcome this difficulty. In the following section, The Zivot-Andrews methodology for testing the unit root hypothesis in the presence of structural break is explained and then this method is applied for the variables under investigation.

Zivot-Andrews unit root test with structural break

Zivot and Andrews (ZA, 1992) propose a variation of Perron's (1989) original test in which the time of the break is estimated, rather than known as an exogenous phenomenon. The null hypothesis in their method is that the variable under investigation contains a unit-root with a drift that excludes any structural break, while the alternative hypothesis is that the series is a trend stationary process with a one-time break occurring at an unknown point in time. By endogenously determining the time of structural breaks, ZA argue that the results of the unit root hypothesis previously suggested by earlier conventional tests such as the ADF test may change.

In this methodology, *TB* (the time of break) is chosen to minimize the one-sided t-*s*tatistic of α=1. In other words, a break point is selected which is the least favorable to the null hypothesis. The ZA model endogenises one structural break in a series (such as y_t) as follows:

H0: $$y_t = \mu + y_{t-1} + e_t$$

H1: $$\Delta y_t = \mu + \beta t + \theta DU1_t + \gamma DT1_t + \alpha y_{t-1} + \sum_{i=1}^{k} c_i \Delta y_{t-i} + \varepsilon_t$$

Equation (4), which is referred to as model C by ZA, accommodates the possibility of a change in the intercept as well as a trend break. ZA also consider two other alternatives where a structural break impacts on the intercept only (model A) or trend only (model B). Model C is the least restrictive compared to the other two models; we thus base our empirical investigation on this model. In equation (4) $DU1_t$ is a sustained dummy variable capturing a shift in the intercept, and $DT1_t$ is another dummy variable representing a shift in the trend occurring at time *TB1*. The alternative hypothesis is that the series, y_t, is I(0) with one structural break. *TB* is the break date, and the dummy variables are defined as follows:

$$DU1_t = \begin{cases} 1 \text{ if } t > TB1 \\ 0 \text{ if } t \le TB1 \end{cases} \quad \text{and} \quad DT1_t = \begin{cases} t - TB1 \text{ if } t > TB1 \\ 0 \text{ if } t \le TB1 \end{cases}$$

The null is rejected if the α coefficient is statistically significant. The optimal lag length is determined on the basis of the t-test or SBC. The "trimming region" where we search for the minimum t-ratio is assumed to be within 0.05T-0.95T or $0.05T \le TB1 \le 0.95T$.

Cointegration Analysis with Structural breaks

Cointegration test with structural breaks

As had been noted as far back as 1989 by Perron, ignoring the issue of potential structural breaks can render invalid the statistical results not only of unit root tests but of cointegration tests as well. Kunitomo (1996) explains that in the presence of a structural change, traditional cointegration tests, which do not allow for this, may produce "spurious cointegration". In the present research, therefore, considering the effects of potential structural breaks is very important, especially because the World economy has been faced with structural breaks like revolution and war in addition to some policy changes.

Saikkonen and Lütkepohl (2000a, b, c) and Johansen and al (2001) have proposed a test for cointegration analysis that allows for possible shifts in the mean of the data-generating process. Because many standard types of data generating processes exhibit breaks caused by exogenous events that have occurred during the observation period, they suggest that it is necessary to take into account the level shift in the series for proper inference regarding the cointegrating rank of the system.

SL and Johansen argued that "structural breaks can distort standard inference procedures substantially and, hence, it is necessary to make appropriate adjustment if structural shifts are known to have occurred or are suspected" (2000b: 451). The Saikkonen and Lütkepohl (SL) test investigates the consequences of structural breaks in a system context based on the multiple equation frameworks of Johansen-Jeslius, while earlier approaches like Gregory-Hansen (1996) considered structural break in a single equation framework and others did not consider the potential for structural breaks at all.

According to Saikkonen and Lütkepohl (2000b) and Lütkepohl and Wolters (2003), an observed n-dimensional time series yt = (y1t,…., ynt), yt is the vector of observed variables (t=1,…, T) which are generated by the following process:

$$y_t = \mu_0 + \mu_1 t + \gamma_1 d_{1t} + \gamma_2 d_{2t} + \gamma_3 d_{3t} + \delta Dt_{0t} + \delta_2 Du_{1t} + x_t$$

Where *DT0t* and *DU1t* are impulse and shift dummies, respectively, and account for the existence of structural breaks. *DT0t* is equal to one, when t=T0, and equal to zero otherwise. Step (shift) dummy (*DU1t*) is equal to one when (t>T1), and is equal to zero otherwise. The parameters

$\gamma(i = 1,2,'),\mu_0,\ \mu_1$, and δ are associated with the deterministic terms. The seasonal dummy variables *d1t, d2t,* and *d3t,* are not relevant to this research since our data are yearly. According to SL (2000b), the term *xt* is an unobservable error process that is assumed to have a VAR (p) representation as follows:

$$xt = A_1 x_{t-1} + ... + A_p x_{t-p} + \varepsilon_t \qquad t=1,2$$

By subtracting xt-1 from both sides of the above equation and rearranging the terms, the usual error correction form of the above equation is given by:

$$\Delta x_t = \prod x_{t-1} + \sum_{j-1}^{p-1} \Gamma j \Delta x_{t-j} + u_t$$

This equation specifies the cointegration properties of the system. In this equation, *ut* is a vector white noise process; *xt= yt -Dt* and *Dt* are the estimated deterministic trends. The rank of Π is the cointegrating rank of xt and hence of yt (SL, 2000b). The possible options in the SL procedure, as in Johansen, are three: a constant, a linear trend term, or a linear trend orthogonal to the cointegration relations. In this methodology, **t**he critical values depend on the kind of the above-mentioned deterministic trend that included in the model. More interestingly, in SL, the critical values remain valid even if dummy variablesare included in the model, while in the Johansen test; the critical values are available only if there is no shift dummy variable in the model. The SL approach can be adopted with any number of (linearly independent) dummies in the model. It is also possible to exclude the trend term from the model; that is, μ=0 maybe assumed *a priori*. In this methodology, as in Johansen's, the model selection criteria (SBC, AIC, and HQ) are available for making the decision on the VAR order. In the following section, we have applied SL tests for the cointegration rank of a system in the presence of structural breaks.

Estimation of the cointegration relationships:

The Johansen's procedure apply the likelihood maximum (LM) on VAR model assuming that errors is *iid*.

$$Y_t = A_1 Y_{t-1} + ... + A_k Y_{t-k} + U_t, \qquad t = 1,..., T$$

Where Y_t is an n-vector of I(1) variables.
We can rewrite Y_t as follow :

$$\Delta Y_t = B_1 Y_{t-1} + B_2 \Delta Y_{t-1} + ... + B_k \Delta Y_{t-k+1} + U_t$$

Where $B_1 = -I + \sum_{i=1}^{k} A_i$ and $B_j = -\sum_{i=j}^{k} A_i$ with j= 2,…, k.

The variables $\Delta Y_t,...,\Delta Y_{t-k+1}$ are all I(0) but Y_{t-1} is I(1), in order that this equation be consistent, β_1 should not be a full rank. Let its rank r and let write

$$B_1 = \alpha\beta'$$

Where α is an n×r matrix and β' is an r×n. Then, $\beta' Y_{t-1}$ are the cointegrated variables, β' is the matrix of coefficients of the cointegrating vectors and α has²the interpretation of the matrix of error correction terms.

Since our interest α and β' we eliminate $B_2,...., B_k$ first. To do this we proceed at follow. Regress ΔY_t on $\Delta Y_{t-1},...., \Delta Y_{t-k+1}$. Get the residuals. Call them R_{0t} Y_{t-1} . regress on these same variables. Get the residuals. Call them R_{1t}. Now, our regression equation is reduced to

$$R_{0t} = \alpha\beta' R_{1t} + u_t$$

This is a multivariate regression problem. Define

$$\begin{bmatrix} S_{00} & S_{01} \\ S_{10} & S_{11} \end{bmatrix}$$

As the matrix of sums of squares and sums of products of R_{0t} and R_{1t}. Johansen (1991) shows that the asymptotic variance of $\beta' R_{1t}$ is $\beta' \Sigma_{11} \beta$ the asymptotic variance of R_{0t} is Σ_{00} and

the asymptotic covariance matrix of $\beta' R_{1t}$ and R_{0t} is $\beta' \Sigma_{10}$ where Σ_{00}, Σ_{10} et Σ_{11} are the

population counterparts of S_{00}, S_{10} et S_{11}.

We shall maximize the likelihood function with respect to α holding β constant and then maximize with respect to β in the second step. We get

$$\hat{\alpha}' = (\beta' S_{11} \beta)^{-1} \beta' S_{10}$$

Note that $\hat{\alpha}'$ is an r*n matrix and the conditional maximum of the likelihood function is given by :

$$[L(\beta)]^{-2/T} = \left| S_{00} - S_{01}\beta(\beta' S_{11}\beta)^{-1}\beta' S_{10} \right|$$

Maximization of the likelihood function with respect to β implies minimization of the determinant with respect to β. We will minimize

$$\frac{\left|\beta' S_{11}\beta - \beta' S_{10} S_{00}^{-1} S_{01}\beta\right| \cdot \left|S_{00}\right|}{\left|\beta' S_{11}\beta\right|}$$

But

$$\min_X \frac{\left|X'(A_1 - A_2)X\right|}{\left|X' A_1 X\right|}$$

is given by the maximum characteristic root of the equation $|A_2 - \lambda A_1| = 0$. Thus, substituting $A_1 = S_{11}$ and $A_2 = S_{10}S_{00}^{-1}S_{01}$ we get the maximum of the likelihood function by solving the eigenvalue problem

$$|S_{10}S_{00}^{-1}S_{01} - \lambda I| = 0$$

Or finding the eigenvalue of $$|S_{11}^{-1}S_{10}S_{00}^{-1}S_{01} - \lambda I| = 0 \quad (1)$$

But the roots of this equation are the r canonical correlations between R_{1t} and R_{0t}. If the eigenvalues of A are λ_i, the eigenvalues of $(I - A)$ are $(1 - \lambda_i)$. Hence if λ_i are the canonical correlations given by solving equation (1), then $(1 - \lambda_i)$ are the eigenvalues of $\left(I - S_{11}^{-1} S_{10} S_{00}^{-1} S_{01}\right)$.

The value of the determinant of the matrix is equal to the product of its eigenvalues, we have

$$\prod_{i=1}^{n} (1 - \lambda_i) = \left|I - S_{11}^{-1} S_{10} S_{00}^{-1} S_{01}\right| = \frac{\left|S_{11} - S_{10} S_{00}^{-1}\right|}{\left|S_{11}\right|}$$

Hence

$$L_{\max}^{-2/T} = |S_{00}| . \prod_{i=1}^{n} (1 - \lambda_i)$$

Johansen propose two statistics to determine the cointegration rank

$$\lambda_{trace} = -T \sum_{i=r+1}^{n} \ln(1 - \hat{\lambda}_i)$$

$$\lambda_{\max} = -T \ln(1 - \hat{\lambda}_{r+1})$$

In structural changes cases we follow the approach of Johansen (1993) and Quintos (1995).

The two procedures start from the equation:

$$R_{0t} = \alpha\beta' R_{1t} + u_t$$

We can rewrite this equation as follow:

$$R_{0t} = \Pi R_{1t} + u_t$$

Quintos separates the sample into different periods assuming the break dates known. For instance, let there be one break date and let Π and (Π_1, Π_2) be the parameters for the whole sample and the split samples. The hypothesis is

$$H_0 = Rang(\Pi_1) = Rang(\Pi_2) = Rang(\Pi)$$

Empirically, we estimate the model in the two regimes and show the cointegration rank in each regime.

Empirical Results

Zivot and Andrews Unit root test

Based on the results reported in Tables 1 and 2, the primary findings of the analysis are as follows. First, the results of the ZA models indicate that all series under investigation are non-stationary. Second, the timing of any structural break (T_b) for each series using the ZA approach is also shown in Table 1. The computed break dates correspond closely with the expected dates associated with the effects of the oil boom in 1974, and the effects of dept crises in developing countries in 1982. Third, the reported

t statistics in Table 1 for μ, β, θ , γ and *a* are significant in the majority of cases. Given the fact that all of the estimated coefficients for the indicator and trend dummy variables are statistically significant one can argue that the estimated structural break dates are indeed statistically significant.

Variables	TB	μ	β	θ	γ	α	Causes for TBs
Ln(y)	52	-0.2159	0.1660	-0.0482	1.0359	0.0267	Oil shock
	1/10/1978	(-3.9165)	(0.6694)	(-3.5377)	(2.9637)	(2.8265)	
Ln(X)	51	-0.1157	0.1716	-0.0079	-0.5355	0.0003	Oil shock
	(1/7/1972)	(-3.1648)	(0.6211)	(-0.8439)	(-1.5359)	(0.0333)	
Ln(M)	55	-0.1700	0.7777	0.0159	-0.6019	-0.0216	Oil shock
	1/7/1973	(-4.0475)	(2.3926)	(1.2925)	(-1.6735)	(-1.6032)	

Table 1. The Zivot-Andrews test results:

Ln(K)	103	-0.1518	-0.1955	0.0004	0.7386	0.0178	Oil shock
	1/8/1973	(-3.8613)	(-1.0383)	(0.1416)	(2.4567)	(2.1363)	
Ln(L)	90	-0.1124	-0.3803	0.0165	-1.5926	-0.0020	Dept crises in
	1/4/1982	(-3.6474)	(-1.7546)	(2.9722)	(-3.961)	(-0.3092)	developing countries

Johansen cointegration test results

As explained above, Johansen (2000b) derived the likelihood ratio (LR) test in order to determine the number of cointegrating relations in a system of variables, by allowing for the presence of potential structural breaks. We now apply a maximum likelihood approach for testing and determining the long-run relationship in the model under investigation. As mentioned earlier, in this procedure Johansen assumed that the break point is known a priori. In the last section, we determined the time of the break endogenously by Zivot-Andrews (1992) procedure. The empirical result based on this method showed that the most significant break for variables of under investigation are consistent with time of oil shock. Therefore, at this stage we include one dummy variable of regime change in order to take into account the structural breaks in the system. Following the Johansen procedure we consider three cases: impulse dummy and shift with intercept included; impulse dummy and shift with trend and intercept included; and finally, impulse dummy and shift with a trend statistically independent (orthogonal) to cointegration relation included. The cointegration results in these three cases are presented in tables 2.

The optimal number of lags is determined by AIC and SC, which is more appropriate for the short span of the data. The hypothesis of the long-run relationship among non-stationary variables is tested and the result is reported in table 2. These tables indicates that the hypothesis of no cointegration r=0 and one cointegration vector r=1 are rejected at the10%, 5% and 1% significance level. The existence of two cointegration vectors is not rejected in any of the three cases mentioned above.

Table 2 :Saikkonen and Lutkephol and Johansen and al cointegration test results

Intercept included (C)						Intercept and trend included (C/T)						Trend orthogonal to cointegration relation (C/O)					
r0	LR	pval	90%	95%	99%	r0	LR	pval	90%	95%	99%	r0	LR	pval	90%	95%	99%

0	322.15	0.0000	82.19	85.80	92.83	0	382.58	0.0000	90.86	95.35	104.14	0	307.84	0.0000	65.73	69.61	77.29
1	155.28	0.0000	58.45	61.56	67.68	1	215.59	0.0000	65.49	69.35	76.98	1	144.25	0.0000	44.45	47.71	54.23
2	28.11	0.1089	38.69	41.33	46.57	2	28.38	0.1758	44.06	47.29	53.76	2	24.95	0.0743	27.16	29.80	35.21
3	15.14	0.5872	22.80	24.97	29.39	3	14.23	0.6234	26.42	29.01	34.29	3	7.79	0.4951	13.42	15.41	19.62
4	7.11	0.3449	10.82	12.65	16.57	4	6.57	0.5631	12.41	14.28	18.24	4	5.27	0.7631	11.22	14.78	17.44

Quintos(1995) and Johansen (1993) estimation approaches results

First regime

From the β vectors we can see that the coefficient on labor in the first cointegrating vector is insignificant. Testing the exclusion of labor from the first cointegrating relationship yields a likelihood ratio test = 2.54, which compared to the 5% critical value $\chi 2(4) = 5.99$ enables us to easily accept the null hypothesis. The results indicate that the model is now completely identified. We estimate a vector-error-correction (VEC) model with two cointegrating vectors and two common stochastic trends. The cointegrating vectors are each indicating the direction where a stable, long-run equilibrium relationship exists and, the adjustment coefficients α are indicating the speed of adjustment of each variable to these long run equilibrium states.

Table 3: The β and α Vectors

Variables	β_1	β_2	α_1	α_2
Y	1	…….	-0.23681	0.21361
			[-2.3564]	[2.0029]
X	-1.058893	0.7234	0.199682	-0.00172
	[-5.0458]	[5.1043]	[4.9735]	[-0.7735]
M	0.13487	-3.1802	-0.235238	0.13217
	[2.6453]	[-7.1413]	[-3.22617]	[3.2285]
K	…….	1	-0.34685	-0.034685
			[-2.943]	[-5.901]
L	0.10456	-0.58456	0.06759	0.0759
	[0.1147]	[-6.6103]	[3.8133]	[7.1233]

Trend	0.001019	0.100258
	[1.1105]	[11.6653]
Constante	-2.1126	6.6296

Table 4 reports the results of the Granger-causality tests. These tests are conducted using a joint *F*-statistic for the exclusion of one variable from one equation as illustrated above. The results of these tests indicate that Granger-causality is running in both directions between, firstly output growth and imports and second between output growth and exports. Thus, our results for Tunisia indicate that trade have a causal impact on output growth.

Table4 : Test Results for Granger-causality

Null Hypothesis:	F-Statistic	Probability
X does not Granger Cause Y	40.6043	6.8E-08
Y does not Granger Cause X	17.1533	0.00014
M does not Granger Cause Y	8.50576	0.00537
Y does not Granger Cause M	1.97104	0.16678

The Granger-causality tests conducted above indicate only the existence of causality. They do not, however, provide any indication on how important is the causal impact that trade has on output growth. For example, when there is a shock to exports, it would also be interesting to know by how much this shock will affect the growth rates of output. In order to provide answers to these questions, we next decompose the variance of the forecast-error of output growth into proportions attributable to innovations in each variable in the system including its Consider again the vector error-correction model. A change in anyone of the random innovations $\eta_{i,t}$, i=1, 2,… will immediately change the value of the dependent variable and, hence, will also change the future values of the remaining variables in the system through the dynamic structure of the model. Since changes in the random innovations produce changes in the future values of the variables, it is possible to decompose the total variance of the forecast-error in anyone of them and determine how much of this variance each variable explains. Since our interest focuses on the response of output growth to shocks in the factor inputs, in particular imports and exports, we only decompose the forecast-error variance of the output growth variable in response to a one standard deviation innovation in capital, labor imports and exports. Since the innovations are not necessarily totally uncorrelated, the residual terms are orthogonalized using a Choleski decomposition in order to obtain a diagonal covariance matrix of the resulting innovations and, therefore, isolate the effects of each variable on the other.

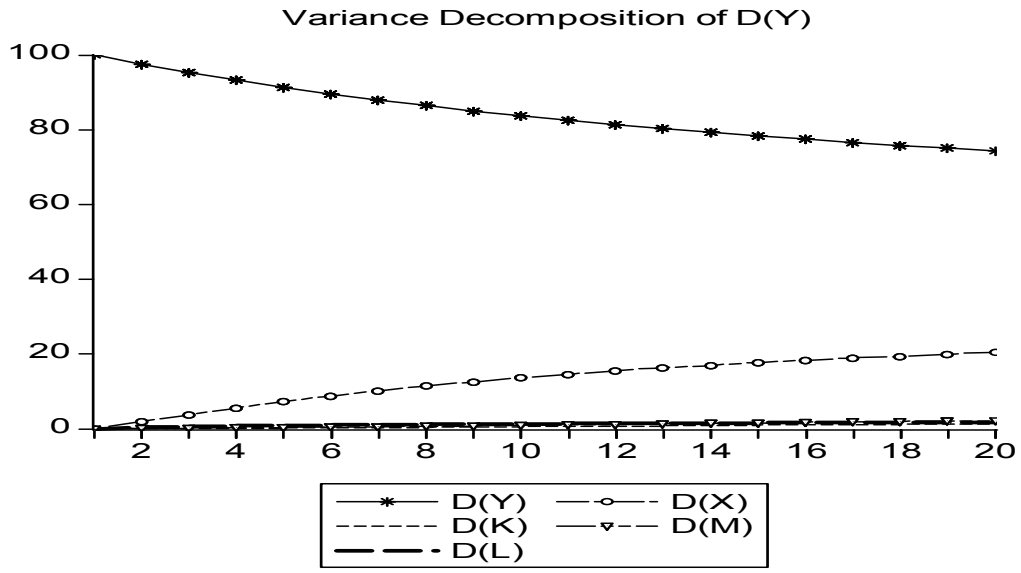
Table 5 and figure 1 report the results of the variance decomposition of output growth in Canada within a twenty period horizon. As can be seen in the table, the four factor inputs together explain about 26% of the future changes in output growth in Tunisia. The remaining 74% are due

to changes in output growth itself. Looking at the separate effects of factor inputs, exports have the highest effect on output growth followed by imports and labor then capital. In addition, shocks to imports and exports seem to generate a permanent effect on output growth.
These results confirm the assumption on the neutrality of trade and clearly illustrate how important could be the effect of imports and exports on the future growth of output.

Table5 : Results of Variance Decomposition

Periode	D(Y)	D(K)	D(L)	D(X)	D(M)
2	97.59528	0.138575	0.310929	1.882544	0.072675
4	93.29019	0.155462	0.734531	5.588535	0.231277
6	89.60841	0.202391	0.992933	8.776274	0.419992
8	86.43781	0.334636	1.170443	11.41399	0.643121
10	83.70667	0.510984	1.305788	13.58355	0.893007
12	81.34190	0.696741	1.417419	15.38595	1.157989
14	79.27655	0.873899	1.514363	16.90825	1.426934
16	77.45517	1.035563	1.601142	18.21694	1.691189
18	75.83406	1.180495	1.680093	19.36041	1.944937
20	74.37954	1.309846	1.752500	20.37332	2.184797

Figure 1. The response of output growth to a one standard deviation innovation in inputs



Second regime

In this second regime, from the β vectors we can see that the coefficient on labor in the first and second cointegrating vectors is insignificant. Testing the exclusion of labor from the first ans second cointegrating relationships yields a likelihood ratio test respectively equal to 2.54 and 1,023, which compared to the 5% critical value $\chi 2(4) = 5.99$ enables us to easily accept the null hypothesis

Table 6: The β and α Vectors

Variables	β_1	β_2	α_1	α_2
Y	1	…….	-1.089456 [-5.18415]	0.142848 [3.68092]
K	……..	1	0.093745 [3.34641]	-0.010154 [-1.96274]
L	-0.03234 [-0.54451]	0.04327 [1.34641]	0.063350 [4.07936]	0.015665 [5.46250
X	0.646257 [7.16639]	-14.23574 [-4.61243]	0.303844 [3.71941]	0.089545 [5.93580]
M	-0.817596 [-4.22466]	14.74609 [5.21224]	0.153854 [1.65265]	0.110552 [6.43064]
Trend	0.001072 [4.51167]	-0.005578 [-1.60628]		
Constante	0.076356	-23.35452		

Table 7 reports the results of the Granger-causality tests. The results of these tests indicate that Granger-causality is running in both directions between, firstly output growth and imports and second between output growth and exports. Thus, in this period, our results for Tunisia indicate that trade have a causal impact on output growth

Table7 : Test Results for Granger-causality

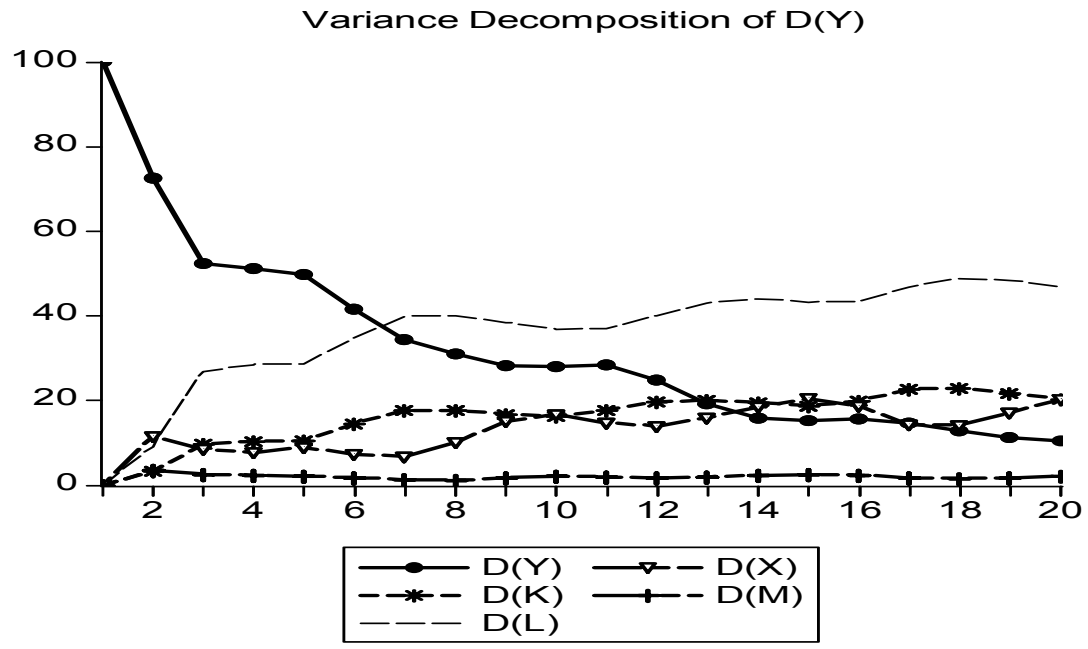
Null Hypothesis:	F-Statistic	Probability
X does not Granger Cause Y	116.914	0.00000
Y does not Granger Cause X	17.9880	1.7E-07
M does not Granger Cause Y	122.641	0.00000
Y does not Granger Cause M	30.2888	3.2E-11

Table 8 and figure 2 report the results of variance decomposition. Looking at the separate effects of factor inputs, labor has the highest effect on output growth followed by capital then exports and finally imports. About 46,8% of future changes in output growth are due to changes in labor, 20,31% due to capital, 20,18% due to exports, and 2,17 to imports.

Table8 : Results of Variance Decomposition

Period	D(Y)	D(K)	D(L)	D(X)	D(M)
2	72.60279	3.235443	9.136678	11.52853	3.496561
4	51.12988	10.35275	28.53823	7.732063	2.247072
6	41.68124	14.48786	34.82013	7.227251	1.783528
8	31.08059	17.75693	39.97063	10.05212	1.139735
10	28.00368	16.22021	36.86628	16.71802	2.191810
12	24.80359	19.66158	39.97475	13.93104	1.629040
14	15.92914	19.37813	44.04836	18.41208	2.232296
16	15.66067	19.95725	43.36729	18.65295	2.361852
18	12.84703	22.83929	48.76728	14.07589	1.470520
20	10.52492	20.31209	46.80774	20.18462	2.170630

figure 1. the response of output growth to a one standard deviation innovation in inputs



Conclusion

The objective of this paper was to examine the long-run determinants of GDP in Tunisia during the period 1960-2003 employing the Saikkonen and Lutkephol (2000) and Johansen and(2001) cointegration method. Prior to the cointegration analysis, the Zivot-Andrews (1992) test was applied in order to endogenously determine the most significant structural breaks in the major drivers of economic growth, physical and human capital, exports and imports. The empirical results based on the ZA model indicate the existence of unit root for all of the variables under investigation. Moreover, we found that the most significant structural breaks over the last forty years occurred as a result of the oil sock in 1973. These results provide complementary evidence to models employing exogenously imposed structural breaks in the Tunisian macroeconomy.

Finally, we employed the Saikkonen and Lutkephol (2000) and Johansen and al (2001.) cointegration approach to determine the long-run factors contributing to economic growth in Tunisia. It is important to use this approach in our cointegration test as during the sample period, the Tunisian economy has been subject to serious structural breaks such as: the world oil shock in 1973. In the presence of such structural breaks, the SL and Johansen cointegration tests conducted in this paper indicate that there are two cointegrating vectors which link GDP with physical and human capital, imports and exports.

Thus, based on the neo-classical one sector aggregate production technology, we developed a vector error-correction model after testing for multivariate cointegration between output, capital, labor imports and exports. The cointegration test indicates that exports and imports enter significantly the cointegration space. The study of the causal relationship between trade factors and output growth in Tunisia, the short-run dynamics of the variables show that the flow of causality is running in both directions between output growth and trade factor. Using variance decomposition of the forecast-error variance of output growth, we found that a shock to imports and exports would cause respectively a 20.37% and 2.184% changes in the future growth rates of output in the first regime and respectively 20.184% and 2.17% in the second regime. With this, our results seem to significantly reject assumption that trade is neutral to growth. Consequently, we conclude that trade is a limiting factor to output growth in Tunisia and, hence, shocks to trade factors will have a negative effect on output.

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FEATURES OF MODERN IT HELP DESK IN ARABIC ORGANIZATIONS QATAR CASE

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Abstract

The help desk in any organization has a crucial mission to perform. One that is to combine help desk in helping the organization accomplish a strategic plan. The help desk is increasingly seen as a business rather than a technical function, and must react accordingly. Its operation must contribute toward the greater organizational goals (Bultema, 1996; LaBounty, 1996), showing itself not simply to be an overhead, or cost centre, but an asset, or profit centre (Bultema, 1995) The research describes the methodology of survey by questionnaire on potential practice of help desk in Qatari organizations. Also, the research summarizes the results briefly. Some focuses on vital issues were discussed such as the potential of the help desk in enabling an organization to gather data on systems use, plan and implement IT development strategies.

Keywords

Help Desk, IT, Arab Organizations, Qatar,

Introduction

The early appearance of this terminology was in mid 1970s used by IBM. Help desk dose not fit into a one subject discipline, it contains computing, information sciences and service management. Research in this area is very limited as this topic considered as new topic and most of researches identify problems rather than giving solutions.
Help desk function has changed rapidly since it was representing a center for solving problems and crises (Call center) facing the end-user (customer or organization) to become as a diagnostic tool and an information supportive system.

Knapp 2003, considered the technical support calls arrives to help desk in early days of its appearance, a distraction to their primary jobs of applications development and maintenance.

At early stages of help desk, organizations found that the structure of help desk in the organization is proven costly as the personnel responsible for this desk are not trained properly to answers all the queries and thus they rely on the expensive skilled developers or field engineers.
With the increasingly demand on computers and computing within today organizations, help desk managers and personnel became an important assets to their organizations solving problems/queries personally rather than passing it to experts using new technology designed specially not just to support helpdesk activities but also to carry out number of other responsibilities such as networking, remote diagnostics and control systems, file management, etc. The later role is considered as a move towards a strategic management.

One of the most important recognized characteristics of modern help desk is to act as management tool that behaves in protective manner rather than reactive manner.
The automated help desk in organizations acts as a sub-team that integrates IT and customer services into organization. This can be considered as significant evidence to recognize the strategic role of the help desk.

Pancucci, emphasized that "while reducing problem calls, the help desk may take on the broader role acting as the front line for IT with a move towards a more expert service acting as advisors in decision making and direct involvement". The table below shows a comparison between traditional and modern help desk:

Traditional help desk	Modern Help desk
Reactive	Responsive
Fixes the results of the problems, not the causes	Fixes problems at sources
Dead end for information	Gathers and disseminates information
Dead end for careers	Provides a worthwhile career path
Technically-oriented staff	Customers service-oriented staff
Isolated	Integral
No influence on matters external to help desk	A key motivator and aid to management decisions.
Struggling for resources	Justifies resourcing
Passive-awaiting customers approaches	Aggressive-marketing its services
Demand driven	Strategy driven

Research scope and Objectives

The early appearance of helpdesk terminology was not too long ago. But since then with the advancements that have taken place in help desk, it became one of the most modern aspects of IT and management. The situation can be revealed more clearly when the help desk involved much modernized and automated aspects to cover area that did not thought of before especially that related to the theme of strategic management.

The importance of the Help Desk in modern Arabic organizations should not be under estimated too; especially when we think of this issue from the view of international competitiveness environment. The Help Desk, in many cases, can in even be the public face of the organization and often represent the 'front line' between the business/organization and the customer (either internal or external). As such, its quality can be of fundamental importance in terms of that relationship. It is NOT an area that can be left to chance!

Unfortunately, reviewing articles and researches published in this particular field in Arabic journals and websites reveal that none or very little material has been written about it which shows little interest in this topic. This really encouraged me to look into this research more seriously. Not only to find out whether such departments are existed in our Arabic organizations, but also to study the extent they are applying the modern help desk in their daily practice. For these reasons, amongst others, I decided to take this challenge.

Help Desk Definitions

In a business enterprise, a help desk is a place that a user of information technology can call to get help with a problem. In many companies, a help desk is simply one person with a phone number and a more or less organized idea of how to handle the problems that come in. In larger companies, a help desk may consist of a group of experts using software to help track the status of problems and other special software to help analyze problems. Some common names for a help desk include: Computer Support Center, IT Response Center, Customer Support Center, IT Solutions Center, Resource Center, Information Center, Call center, and Technical Support Center.

Currently there is no hard and fast definition of the term 'help desk': a recent report (by Brown, Duncan and Burrows) highlights the 'loose and flexible' uses of the term. However, implicit in its name is the basic function of being a source of information or action on demand, to aid the caller in carrying out a given task. This research will concentrate on the issue of Information Technology (IT) related queries. This basic task is encapsulated in the Gartner Group's definition of the help desk's mission: 'to provide a single point of contact and responsibility for rapid closure of end-user technology problems'. In addition to this, the help desk's role is often extended into that of a technology-facilitator, which is achieved by the gathering and analysis of data at the help desk to proactively manage end-user technology."
For the purpose of the research, a definition of the help desk was adopted as follows:
a point of service which provides on-demand advice, information or action to aid the user in carrying out an IT-related task.

The most important characteristics of helpdesk consist of:
(1) Centralized (one center) or multiple help desks,
(2) Staff working exclusively, on rotation, on secondment (i.e. staff who works at the helpdesk not just answering the telephone but doing another job)
(3) Manning by experts or staff with basic knowledge who can pass on problems.

Definitions of Help Desk on the Web

- A support system designed to assist end users with technical and functional questions and problems. (Georgetown)
  www.georgetown.edu/uis/ia/dw/GLOSSARY0816.html
- a set of procedures for getting speedy assistance to users concerning the use of a computer. Help may be provided by telephone, fax or e-mail, or through summary listings of typical questions and answers. (Nces)
  nces.ed.gov/pubs98/tech/glossary.asp
- A single point of contact for all user inquiries and problems about a particular information system or for all users in a particular department. (Cbu)
  www.cbu.edu/~lschmitt/I351/glossary.htm
- A call center that handles questions about products. The term most often refers to technical support centers for computers/software.
  www.pcai.com/web/glossary/pcai_g_intel_glossary.html
- A dedicated internal organizational resource that provides technical or functional application problem-solving advice and follow-up to system users.
  www.bridgefieldgroup.com/glos3.htm
- Generally refers to a call centre set up to handle queries about product installation, service, usage or problems.
  www.voiceanddata.com.au/vd/admin/glossary.asp
- Type of call center call that involves product use and support. Common for computer hardware and software applications.
  www.callcenter101.com/call-center-glossary.htm
- Sometimes called a "service desk", provides a focal point for providing first line incident support; help with using IT-based business systems; and management reporting on IT service quality.
  www.data-core.com/glossary-of-terms.htm
- a source of technical support for hardware or software. Help desks are staffed by people who can either solve the problem directly or forward the problem to someone else. Help desk software provides the means to log in problems and track them until solved. It also provides the management information regarding support activities.
  www.pcionline.edu/technology_terms_pinnacle_career_institute_online.htm
- Performs initial logging function to open a problem record. Resolves problem if possible or forwards it to the appropriate Branch for resolution.
  www4.hawaii.gov/dags/icsd/ppmo/Stds_Web_Pages/IT030104/it030104s7.htm
- a service that provides information and assistance to the users of a computer network.
  http://wordnet.princeton.edu/perl/webwn
- A help desk is an information and assistance resource that troubleshoots problems with computers and similar products. Corporations often provide help desk support to their customers via a toll-free number and/or website. There are also in-house help desks geared toward providing the same kind of help for employees only.
  http://en.wikipedia.org/wiki/Help_desk
- Help Desk is a web comic by Christopher B. Wright which debuted on March 31, 1996, making it one of the older web comics on the Internet. The comic is a satirical and cynical view of computer software companies in general and of the antics of Microsoft, Apple, and Linux in particular. This is done through the employees at Ubersoft, a fictional computer

software company that markets a number of software products, including a computer operating system called Nifty Doorways.
http://en.wikipedia.org/wiki/Help_Desk

Literature Review

Literature on the subject of help desks consists largely of; Journal articles, citing examples of help-desk use in industry, and dealing with help-desk software.

Professional journals

There are several professional journals:

- 'LifeRaft' and 'Customers', focus specifically on the helpdesk issues.
- Dealing with the broader field of customer support, such as Service Management, Call Centre and Service.

Computing and information science journals

Journals that extract information mainly from industry, such as

- Network Computing
- InfoWorld.

Books

A few books have appeared its emphases on:

- Help Desk Handbook (1994) by Clarence Thomas: it emphasized on helpdesk practical aspects
- Implementing an IS Help Desk (Plunkett, 1993), it gives many examples deal with specific types of help desk.
- Staffing the Call Centre (Gallagher, Czegel, Bruton and TCS Management Group), they published this book in 1995.
- Running an Effective Help Desk
  by Barbara Czegel, softcover, 434 pages, 1998
- The Complete Guide to Customer Support by Joe Fleischer and Brendan Read, softcover, 272 pages, 2002
- How to Manage the IT Helpdesk: A Guide for User Support and Call Centre Managers, 2nd edition by Noel Bruton, softcover, 347 pages
- A Practical Guide to Call Center Technology, by Andrew J. Waite, softcover, 497 pages, 2001

Specialist user groups

- Help Desk Institute (HDI) in the USA.
- Albuquerque Help Desk Association is a regional user support group, USA
- The Helpdesk User Group (HUG) in the UK.

- The International Association for Management Automation (IAMA).

Official and quasi-official groups

There are a number of official and quasi-official groups which offer advice and guidance to help-desk providers, such as:

- UCTLIG/UCISA a group concerned with user support in universities;
- Central Computer and Telecommunications Agency (CCTA) set up by the Government to promote business efficiency and effectiveness through the use of information systems.
- Call Centre Institute for Quality (CCIQ) established in 1995 to act as a center for the exchange of best practice.

Specialist consultancies

There are some consultancies group provides variety of services:

- MUNS Group provides advisory services and customized contract research.
- Gartner Group provides a subscription service.
- META Group has carried out studies on issues such as costs of support and help-desk software.

The Internet

The Internet and e-mail communities have been invaluable in the course of gathering information for the support of any research.

Papers in serials

(with R.C. Marcella). Key factors in help desk success. Managing Information, 2(6), June 1995, p37-39.
(with R.C. Marcella). The Role of the Help Desk in the Strategic Management of Information Systems. OCLC Systems and Services, 12(4), 1996, p4-19. Awarded "Most outstanding paper 1996" by the Literati Club.
(with R.C. Marcella) The Academic Help Desk: In need of support? Campus Wide Information Systems, 14(4), December 1997, p120-127. A paper paying special attention to support issues in academic environments.

Conference papers

ITIMF: IT Service Management Conference and Exhibition: 4th-6th November 1996, Brighton. "Quality and the Role of the Help Desk". Further details from ITSMF, 1a Taverners Square, Silver Road, Norwich, NR3 4SY,
UCISA-TLIG Conference: 'New Opportunities - Information Services for the Next Millenium', 30th March-1st April 1998, Southampton. "Key Factors in Help Desk Success".

Repeat session due to popularity*!* This presentation is augmented by the first publication of the results of a survey of UK academic help desks. Further details from the UCISA web site.
Software Education: 5th Annual Support Services & Help Desk Conference: 28th-29th April 1998, Wellington, New Zealand. Two presentations based on our research findings and visions for the future:

- Keynote presentation: "New & future issues for the help desk"
- Workshop presentation: "Getting management buy-in"

Reports

(with R.C. Marcella) Key Factors in Help Desk Success: an analysis of areas critical to help desk development and functionality, BLR+DD Report no. 6247, The British Library, 1996. Approximately 160 pages. Industry surveys and detailed case studies are used in an analysis of the role of the help desk, the result of over 1 year of investigating the subject.

Data Gathering

Initially a survey by postal and in person questionnaire accompanied by an explanatory letter was carried out targeting managers in charge of IT issues picked up from a list of Qatari organizations use IT facilities to gather data on :
• Help desk (HD) operations,
• Monitoring and evaluation HD,
• HD usage,
• staffing,
• Scale of the operation,
• Definition and formalization of the HD,
• Structure of the HD within the organization.

The questionnaire consisted of 25 questions, mainly multiple choices from closed questions. Efforts were paid for framing the questions, in a way that they should be clear to all respondents. Care had also to be taken in interpreting the responses, because of the lack of a "common vocabulary" among respondents.

The questionnaire was tested on ten individuals: academics; experts and practitioners. Some minor modification, in areas such as clarification of language, resulted from the piloting process.
The completed replies were received from 92 managers, a 47 percent response rate. The data resulting from the present questionnaire will be biased more toward those organizations which do operate helpdesks.
The sample frame for the questionnaire consisted of Qatari organizations use help desk utilities, in public and the private sectors.

Summary of research results and discussions

Analysis on the data collected was carried out using the SPSS package. The following findings can give an insight to the provision of help desk in Qatar:

Current help-desk provision in Qatar

1- Even that definition of "help desk" is not universally agreed on, 74% of respondents described themselves as having help desks, further analysis from other studies reveals that this figure to be closer to 50%.
2- 75% of the sample has only one helpdesk center which indicate that there is some tendency to centralization of helpdesk in Qatari Organizations.
3- About 20% of Qatari organizations do not have dedicated helpdesk. The 45% showed that the helpdesk centers are distributed according to a designated support groups i.e. not paid support staff, but networks of employees with sufficient expertise to help others.
4- Helpdesk services are provided by evenly split sourcing, 51% with no outsourcing and 49% with outsourcing.
5- Majority of helpdesk centers responsibility (47%) is related to IT department which shows a good sign of relevance in the Qatari organization.
6- Helpdesk centers are not clearly decided with reference to its decision autonomy from its parent department.
7- About 25% of helpdesk users are located in big user group (1000-1700 user), and 63% are located in small group of less than 150 users.
8- One-third of users group is using one site only. But there are 68% of them use 1-5 sites.
9- Helpdesk center is not responsible for only one task, but it is a combination of tasks. No specific task was overwhelming.
10- 48% of helpdesk services deals with a wide, unspecified range of IT products- any query at all.
11- 42% of the Help desk services include network, and 35% on PCs.
12- Qatari organizations associated with help desk services are evenly split on the basis of providing services i.e. 50% uses agreement/contract to provide the helpdesk services.
13- 82% have no charging/costing mechanism for their services.
14- Three-quarters of users report some defined procedures to be followed in contacting help desk.
15- There is not a dominant mean used at helpdesk to solve problems. The highest was 20% of solved problem using staff expertise, and lowest was 13% to remove computer access to the problematic.
16- 92% of helpdesk staff answering and solving problems rather than just pass the problem for further follow-up.
17- 60% of staff at help desk work exclusively. This implies that 40% of the staff works at Help Desk are not originally assigned to this department.
18- 69.4% of total number of received calls was 40 calls or less per day.
19- Only 45% of calls have 70% or more chance to be fixed at first call.
20- 58% of calls are handled by staff with basic knowledge and passed to expert or team if not capable of immediate solution, whereas, only 19% of the received calls are directed and handled by helpdesk that manned by experts.

21- About 43% of organizations which has Help Desk experience, has 3 workers holding such experience, 38% of organization has 4-6 workers with IT/computer experience, 38% of organizations have worker with relevant degree, 53% of organizations have worker with general administration skills. 40% of organizations have 4 workers with some experience of this organization.
22- 83% of staff receives training in the systems supported.
23- 62% of generated information through help desk operation can be used to identify regular hardware/software faults.
24- 46% of studied organizations had their help desk function existed for no more than one year.
25- 25% of organization brought their help desk to life through the informally grew as need arose, whereas 44% are existed as internal work group were assigned.
26- Only 34% of organizations were willing to participate in a future follow up study.

Successful Factors in developing Help Desk

There are some factors that lead to a successful development of help desk. These can be surmised as follows:

- **Stating Help desk Vision:** a statement of HD vision with its support strategy that clearly outlines where the operations are at present going and gives the roadmap for where they are going in the future.

- **Organizing the help desk**: by having a variety of design alternatives available to decision maker, taking into considerations budget they have, customers requirements, and the culture of organization business and what do the organization want to provide.

- **Assessment of current HD:** with all factors of strengths and weaknesses, in addition to opportunities and potential threats**.**

- **Project plan:** that identifies areas for continues improvement. Such plan shows how the HD is aligned with the rest of the organization and how the goals are going to be achieved and outlining how the HD fits into the organization departments.

- **Preferable way that organization's customers to contact the Help Desk.** There are several means of contacts: phone call, voice mail, e-mail, instant messaging, and Web-submitted requests that can integrate with organization automated computer system to initiate automatic callbacks.

- **Estimate the acceptable waiting time for a contact to be answered**, this would incur two important factors: first is the customer expectation and second the cost of service (requirement) which is correlated with the length of the call. This piece of information is very important to design or redesign organization help desk.

- **Decide on Outsourcing or Not**

  There is a clear trend today of fast changes in the organization environment and consequently changes in IT skill and costs of maintaining this change. These changes has caused many organizations to seek outsource service providers to support such changes. Outsourcing of Help Desk could be considered as an option to manage the expense and investment of building a support structure from scratch, to reduce the impact and costs of staff turnover, to provide the needed skills and expertise that the Help Desk staff doesn't have or to allow the business to focus on its core competencies.

- **Considerations for Consolidating the Help Desk:** One of the favorable ways to reduce the help desk costs and consolidate data for more accurate analysis, improve customer satisfaction through the support consistency and shortening the response time is to consolidate the multiple help desk into a single point of contacts.

  According to the Gartner Group article "Pitfalls in Help Desk Consolidations" published November 17, 1999, the following management skills are required when managing a consolidated desk:

  • Business knowledge
  • Financial skills
  • Leadership skills
  • Internal and external negotiation skills
  • Communication (i.e., written, verbal, presentation) skills
  • Effective customer service skills
  • Technology skills
  • Training skills
  • Quality-assurance skills

- **Structuring Help Desk:** The days of having a Help Desk is available to do nothing more than answering the phone are gone. The modern support desks today are expected to respond to the customer in a manner of seconds whether the request comes via voice, e-mail or chat, and to quickly resolve the customer's problem during the initial contact or, at a minimum, gather and analyze enough data to diagnose the problem and get it to the right support partner who can resolve the problem. Help Desks are also expected to provide business value by identifying problem trends and eliminating recurring problems, to learn and use new technology to streamline the support process. Analysts who are the first point of contact for the customer are fully occupied with meeting service levels and resolving problems, with little time left to devote to supporting other tasks.

- **Customer Interface:** Today there are many choices to be considered in how you would like to provide your customers with access to your Help Desk. The traditional phone calls are still viable choices; you can also use voice mail, fax, e-mail. You can use one, some or all of these methods when building or re-engineering your Help Desk. The method you choose will depend on your budget, the size and culture of your customer base, the type of support you provide and the technology you have in place.

- **Communication within the Help Desk:** Each one of the analysts on the Help Desk is one channel of contact with the customer and must be enabled to resolve problems quickly and efficiently while presenting a professional and courteous face to customers. To achieve this, they need to be kept informed of all the information that impacts their ability to provide support

The potential of the help desk in the strategic management of information systems

Today, there is a shift in the customer service orientation from the help desk as IT's technical problem fixer to the help desk as the front-end to a service provider.
The modern helpdesk became an extension to the organization and integrate the IT and customer service in the organization which shows the how strategically important the help desk to organization.
The modern help desk employ the IT within the organization and therefore the help desk can act as the public face of IT in the organization in another words it can be considered as a tool for investigation and reviewing operations.

Gathering data on present patterns of systems use

It has been found from the data we collected that 69 percent of dedicated help desks gather simple statistics on usage. Statistics have a number of very valuable potential uses: as a source of information on the nature of problems encountered at present; to monitor usage of systems and the spread of users for each; to identify training needs; to identify gaps in provision and duplication of data input; and to assist in the mapping of the present pattern of information collection, dissemination and use within the client base. From the results of the survey, more than 55% of all help desks are at present using such information to identify training requirements. More than 60 percent of all help desks use the information they gather to identify regular faults.

Collecting data on IT needs

The method of gathering data continuously by the help desk is considered one of the best strategies to maintain efficient Help Desk. If the information which the help desk can gather is used effectively, requirements and performance may be monitored on a continual basis, making use of knowledge gained over time concerning users and systems.

Investigating the impact of IT strategies

Through the help desk's two-way communication with its customers it is able to organize information on the effectiveness of current strategies, either by encouraging customers' views or by the interpretation of incoming call data.

Conclusion

The help desk is increasingly seen as a business rather than a technical function, and must align itself accordingly. Its operation must contribute toward the greater organizational goals (Bultema, 1996; LaBounty, 1996), showing itself not simply to be an overhead, or cost center, but an asset, or profit center (Bultema, 1995).
The success factors of the help desk can be shown through its "front-line" position which allows the managing team of help desk to gather data from users over time continuously, therefore, IT help desk is not only a tool to solve the organization problems as the calls arrive but eliminating these problems from the source and improving services in line with organization needs. Rather, the help desk can dynamically and continuously provide data as a part of a process of continual change and improvement.

We should also acknowledge the new means by which help-desk support can be provided, that is by Internet both via e-mail and World Wide Web.
The growth in demand on help desk is not as a result of the help desk being available on the Internet, but rather from the growth of Internet users, mainly non-technological users. This is proof that the need for help-desk support will keep growing and there will be a greater need for helpdesk support within the organization.

This research could be considered as a first step to investigate the existence of such utility at Qatari IT adopted organizations. Never the less the scope that help desk which offering the management such tool has showed that the modern help desk is not just a reactive tool to support the user need, but has a role to play in the support of management, in the development of IT strategy. If the help desk is to insure management backing rather than simply consent we must make its case in very clear terms which management understand.

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