
Adnan F. Abo Al-Haija*

ABSTRACT

This paper attempts to examine the relationship between financial development and domestic investment in Jordan over the period (1978-2004). It provides an overview of theoretical analyses and arguments regarding the channels through which banking-and stock-market development affect domestic investment. The results are partially consistent with theoretical underpinnings. The stock-market development indicators are found to have a positive and significant effect on domestic investment, while banking-development indicators do not show any non-negative effect. The last result could be attributed to tight lending policies adopted by Jordanian banks during the period under consideration, and to investors great reliance on personal savings in financing new projects or on internal funds in expanding existing businesses. This paper also finds that growth rates in real per capita income, do not significantly affect the share of investment expenditures in the GDP, while they do have a magnificent effect on the absolute levels of domestic investment. The results suggest that new measures should be taken to ease long-term bank loans provided to investors in real sectors and to provide special and widespread credit facilities to participants in Amman Stock Exchange.

Keywords: Domestic investment, Bank-based financial development, Stock-market based financial development, Liquidity indicators, Accelerator theory.

1. INTRODUCTION

Economists refer to financial development as that improvement in the efficiency of the financial system, which leads to mobilize financial resources towards their highest productivity through funding real investment projects (Tsuru, 2000; Levine, 2003). Financial development is related to financial functions that may affect saving and investment decisions of individuals and firms. These functions include the production of information about possible investment opportunities, reduction in the transaction costs of converting illiquid to liquid assets, monitoring investments, managing risk and exerting corporate governance.

There are many factors determining how well financial systems provide these functions. Among those factors are prevailing market frictions which are related to information asymmetry in financing projects, and the legal and regulatory environment including tax systems. When financial systems develop over time, their ability to provide better functions increases, and investors become less constrained in obtaining needed external funds (Whited, 1992; Wachtel, 2003). Moreover, developed financial system stimulates investment in higher-return higher-risk projects through risk diversification and risk sharing.

Researchers emphasize that local financial development by easing external financing enhances the probability an individual starts his own business, promotes the expansion of existing firms, and increases competition in product and financial markets (Fazzari, 1988; Levine, 2003; Ndikumana, 2003).

This paper attempts to investigate the relationship between financial development and domestic investment in Jordan, which raises two main questions. First, how well and in which form did the financial system in Jordan evolve over the recent past period? Second, does the development in the banking system and in the stock market have had an influential and significant effect on domestic investment?

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The main aim of this paper is to find answers to the above questions.

The remainder of this paper is organized as follows; section 2 discusses hypothetical links between financial development and domestic investment by focussing on the role of the banking sector and the stock market in stimulating domestic investment. Sections 3 reviews the well-known and mostly used indicators of banking and stock market development. Section 4 describes the econometric model of this study including specifications, theoretical justifications, and possible estimation problems. Section 5 describes the data and section 6 presents the results of estimation. The conclusion and recommendations are set in section 7.

2. LINKS BETWEEN FINANCIAL DEVELOPMENT AND INVESTMENT

The Role of Banks

Banks play a major role in enhancing domestic investment through different channels. First, they encourage savings from different and various sources especially from those who are reluctant to lend for long-term periods, and to provide likely a full-coverage insurance against liquidity risk by maintaining sufficient cash and semi-cash balances to satisfy liquidity needs of savers. Simultaneously, they are pooling such savings into long-term loans to finance illiquid and more profitable projects. Hence, such form of finance reduces the premature liquidation of profitable investment projects (Armendariz de Aghion and Morduch, 2000; Tsuru, 2000; Levine, 2004).

Second, banks are generally in a position which enables them to search for and to create new information about investment opportunities with relatively lower cost than what may face individual investors. This is because banks usually hire trained personnel and investment experts. Moreover, such information is usually made available to many actual and potential investors. Thus, banks are actually economizing in the information searching and acquisition costs. Without banks, each individual investor will pay separately large fixed cost for the same piece of information (Berger et al., 2002; Hauswald and Marquez, 2002).

Third, banks can identify and benefit entrepreneurs who have innovative ideas regarding the production of new goods or in improving existing production processes. They also help in promoting young entrepreneurs who create new businesses especially small enterprises (King and Levine, 1993b; Black and Strahan, 2002).

Fourth, banks exert control over the management of firms, which leads to improve the efficiency with which resources are allocated (Bencivenga and Smith, 1993).

Another line of argument postulates that banks may affect domestic investment negatively when they extract accrued rent from the information collected about profitable projects, and may also preclude competition in the credit market and reduce incentives to enforce efficiency in corporate governance when they keep close ties with firms (Weinstein and Yafeh, 1998).

The Role of Stock Markets

According to the empirical evidence in the literature of financial development, stock markets play a great role in enhancing domestic investment which may occur through the following channels:

First, stock markets provide up-to-date information about the performance of participating firms which enables investors to identify profitable investment opportunities, and therefore help them to direct funds towards their highest potential yield (Levine, 2004).

Second, stock markets expand risk-sharing among large number of shareholders within and over generations. Long-term projects are usually high return and high risky and they are indivisible and require large initial investment. Therefore, individual investors are reluctant to take such risk. Stock markets provide the opportunity to undertake such projects and at the same time they reduce risk facing individual investors by the means of diversification, and hence promote investment (Levine and Zervos, 1998; Levine, 2004). Moreover, portfolio diversification encourages specialization of production by firms, which expands investment opportunities (Tsuru, 2000).

Third, active stock markets affect positively the rate at which stocks could be liquidated because investors could sell their shares easily without affecting initial investment. This, in turn, motivates savers who are reluctant to be engaged in direct investment to provide long-term financing through stock trading. Augmenting the liquidation of long-term investment by changing the ownership of shares enhances investment and simultaneously reduces the cost of capital (Levine and Zervos, 1998; Rousseau and Wachtel, 2000).

Fourth, stock markets offer the opportunity for investors to exert pressure on corporate management.
Linking managerial rewards and compensations to performance keeps managers sufficiently motivated to pursue the interests of shareholders in maximizing firm’s value and to avoid the threat of takeovers. That would likely improve the efficiency of firms in allocating their resources and encourage existing and potential shareholders to expand their investment (Stein, 1997; Barro, 1990, Levine, 2004).

In another point of view, some researchers argue that managers’ investment decisions are not always consistent with outsiders’ valuation due to the presence of asymmetric information. Therefore, market valuations do not necessarily reflect firm’s profitability, which weaken the effectiveness of controlling managerial performance and reduce the threat of potential takeovers (Ndikumana, 2003).

3. FINANCIAL DEVELOPMENT INDICATORS

Banking Development Indicators

Researchers in the financial development have referred to many indicators of banking development. The most used indicators are as follows:

1. Bank Credit: which is the value of loans made by banks to the private sector (BCP) divided by GDP. (Levine and Zervos, 1998; Ndikumana, 2003).

2. Financial Depth: expressed as the ratio of the stock of broad money (M2) to GDP (King and Levine, 1993a). This indicator reflects the overall size of the banking sector relative to the economy-wide basis. It does not indicate, however, how financial resources are allocated.

3. Total domestic credit as a percentage of GDP (Ndikumana, 2003).

4. Total liquid liabilities as a percentage of GDP (Ndikumana, 2003).

According to the empirical findings of the above-stated studies, the “Bank Credit” indicator is the most robust measure of banking development. Other indicators do not distinguish between credit made to the private sector for investment purposes from that which is made to the government or to public agencies.

Therefore, this study will refer mainly to the “Bank Credit” indicator as a measure of banking development.

Stock-Market Development Indicators

The most known indicators of stock-market development in the literature are as follows (Levine and Zervos, 1998):

1. Liquidity indicators:
   a) Turnover indicator, which equals to the ratio of the value of trades of domestic shares at the domestic market (VT) to the value of listed domestic shares (CAP). This indicator reflects how liquid the market is. It is not influenced by actual or expected price increase in stock prices.
   b) Value Traded, expressed as the value of trades of domestic shares (VT) as a percentage of GDP. This indicator reflects the liquidity of the stock market on an economy-wide basis.

   Both indicators refer to the ease with which investors can buy and sell equities.

2. Capitalization, which equals to the value of listed domestic shares on domestic exchange (CAP) as a percentage of GDP. This indicator measures the size of the stock market relative to the economy-wide basis.

3. Volatility of stock returns, which may reflect risks of the stock market.

Researchers found that the most fitting and robust indicators of stock-market development are those of liquidity indicators (Bencivenga, et.al., 1995; Demirgüc-Kunt and Levine, 1996; Levine and Zervos, 1998; Tsuru, 2000).

4. THE ECONOMETRIC MODEL

Based upon the above discussion and referring to the theoretical arguments made in previous sections, we assume that financial development indicators and other controlling variables are affecting domestic investment as in the following functional form:

\[
I_t^* = \alpha + \beta_1 FDB_{t-1} + \beta_2 FDSM_{t-1} + \beta_3 \left( \frac{Y_t}{Y_{t-1}} \right)^{\beta_4} + \epsilon_t \text{ (1)}
\]

where,

- \( I_t^* \) is the ratio of domestic desired investment to GDP at time \( t \).
- \( FDB_{t-1} \) is the indicator of bank-based financial development, lagged for one period.
- \( FDSM_{t-1} \) is the indicator of stock-market based financial development, lagged for one period.
- \( Y_t \) is the real per capita GDP at time \( t \).

\( \beta_1, \beta_2, \beta_3 \text{ and } \beta_4 \) are fixed parameters.

(1) The M2 monetary aggregate consists primarily of currency in circulation, demand deposits, saving deposits and small-denomination time deposits (refer, for instance, to Abel and Bernank, 2001, 245-246).
$u_t = \text{is the disturbance term at time } t \text{ (assumed to be normally distributed with } E(u_t) = 0, E(u_t^2) = \sigma^2, \text{ and } E(u_s, u_t) = 0, \text{ for } s \neq t).$

Both indicators of financial development appear in the equation with a one-period lag to get rid of the simultaneous bias that may result from possible two-way causality-effect between financial development and investment. Simultaneous bias occurs when financial development indicators response directly to the growing demand for investment funding, or indirectly through output expansion (Levine, 2003, Tsuru, 2000). Furthermore, contractual obligations may restrict firms from switching from one source of finance to another which may delay the implementation of planned investment to next period(s) “gestation period” (Gujarati, 2003).

Rewriting equation (1) in the log-form, it will become as follows (2):

$$\ln I_t^* = \beta_1 + \beta_2 \ln FDB_{t-1} + \beta_3 \ln FDSM_{t-1} + \gamma \ln gy_{t} + u_t$$

where,

$\gamma = \text{is the annual growth rate of real per capita income (the controlling variable).}$

The presence of $\gamma$ in the model is justified by the “accelerator theory”, which states that investment expenditures increase in response to an increase in the demand for output. Hence, positive growth rates in the real per capita income will lead to an increase in desired real investment.

A developed financial system facilitate financing processes and enable investors to easily obtain needed funds (Ndikumana, 2003).

Applying the partial (stock) adjustment hypothesis to the relation that links desired with actual investment expenditures as in the following form (3):

$$I_t = \left( \frac{I^*_t}{I_{t-1}} \right) ^\delta$$

where $(0 < \delta \leq 1)$ is a constant, refers to the percentage of the discrepancy between the actual and desired investment that supposed to be eliminated within one period.

Transforming equation (3) to the log-form, and substituting for $\ln I_t^*$ into equation (2), then rearranging, we obtain the following equation which we intend to estimate:

$$\ln I_t = (\beta_1 \gamma) + (\beta_2 \gamma) \ln FDB_{t-1} + (\beta_3 \gamma) \ln FDSM_{t-1} + (\beta_3 \gamma) \ln gy_{t} + (1-\delta) \ln I_{t-1} + \delta u_t$$

or,

$$\ln I_t = \alpha_1 + \alpha_2 \ln FDB_{t-1} + \alpha_3 \ln FDSM_{t-1} + \alpha_4 \gamma + (\alpha_5) \ln I_{t-1} + e_t$$

where $e_t = \delta u_t$ (4).

A priori knowledge suggests that all the parameters of equation (4) are expected to be positive indicating the positive relationship between investment on the one hand, and financial development indicators and growth rates of real per capita income and lagged investment on the other. The value of the lagged investment coefficient is supposed to be a positive fraction; because actual investment levels need usually more than one period to fully adjust to the desired levels ($\delta = 0$).

Equation (4) will be estimated by using annual data which covers the period (1978-2004). This period has been chosen because it is the longest possible period, where data for each included variable are available.

This study relies on two sources of data, statistical bulletins issued by the Central Bank of Jordan and statistical yearbooks issued by the Department of Statistics.

5. DATA DESCRIPTION

A Graphical Demonstration and Statistical Descriptives

Figure (1) shows that domestic investment in Jordan as a share of GDP has been generally declining over the period of study. The highest value was 0.44 in 1981 decreased to 0.21 in 2004 (Table 1A in the appendix).

The annual growth rate of the investment/GDP ratio was on average (-1.7%) over the period (Table 1). The negative growth rate has occurred because investment expenditures grew less rapidly than GDP (their annual growth rates were about 6% and 8%, respectively; Table (1). Hence, investment-GDP gap was widening over the period.

Figure (2) demonstrates time trends of bank-based financial development indicators. It is obvious that curves of Bank Credit and Financial Depth are upward slopping (4) Because $e_t$ is equal to a fixed fraction of $u_t$, $e_t$ is supposed to satisfy the same assumptions as previously stated for $u_t$ (see Gujarati, 2003, 676-677).
with some divergence over short-time periods. Their average annual growth rates over the period were slightly below 2% (Table 1).

The mean value of “Bank Credit” (loans granted to the private sector as a share of GDP) in Jordan is about 62%, which falls a little short of that value in financially developed countries.(5)

Figure (3) demonstrates the evolution of stock-market based financial development indicators over time. All of the three indicators have shown positive trends over the period. Their average annual growth rates are ranging between 7.6% and 3.2% (Table 1).

It is worth noting that the mean value of the “Turnover indicator” in Jordan is about 14%, while it is 50% in Japan and USA, but it is only 6% or less in Bangladesh, Chile and Egypt during the period 1976-1993 (Levine, 2003).

It is found that the mean value of the indicator “Value Traded” in Jordan is 10.5% over the period of study (table A.1). This figure is very near to what has been found for other countries.

According to Levine and Zervos (1998) the mean value of the “Value Traded” in 47 selected developed and undeveloped countries was 11% during the period 1976-1993.

On the other hand, annual growth rates in real per capita income were positive for some years and negative for others. Generally, the average annual growth rate was around -1.2% (Table 1). This negative rate means that the real purchasing power of Jordanian citizens was declining over time.

Correlations

Table (2.A) in the appendix presents simple correlations between explanatory variables. The following points worth to be highlighted:

First, both indicators of bank-based financial development: “Bank Credit” and “Financial Depth”, are highly correlated. The correlation coefficient is equal to 0.85. Therefore, each indicator should replace the other in the regression equation to avoid multicollinearity.

Second, stock-market based financial development indicators are also highly correlated. The highest correlation is between “Value Traded” and “Capitalization” (0.87), and also between “Turnover” and “Value Traded” (0.83). Again, and for the same reason, they should enter the regression equation separately.

High and statistically significant correlation coefficients within indicators of either bank-based or market-based financial development are theoretically expected by definition of variables, which are either directly or indirectly related.

Third, Bank Credit is weakly correlated with stock-market indicators except with Capitalization, whereas Financial Depth is highly correlated with all stock-market indicators. Thus, our attention will be focused on estimation results where the variable Bank Credit enters the regression equation.

Finally, growth rates of real per capita income are uncorrelated neither with bank-based nor with stock-market based financial development indicators.

6. RESULTS OF ESTIMATION

Table (2) summarizes the results of estimating equation (4) by using “OLS”(6) with the available data covering the period (1978-2004).

To avoid the multicollinearity problem that may arise when the equation includes more than one indicator of either type of financial development due to their high correlation, equation (4) has been estimated six times (which we call cases).

In case (1) through case (3) “Bank Credit” has entered the equation individually with each one of stock-market indicators. These cases have been classified in the table as panel (a).

Panel (b) consists of the other three cases where the same estimation process has been repeated except that we replace “Bank Credit” with “Financial Depth” as an indicator of bank-based financial development.

Before we proceed to the discussion of results, it is important to test for autocorrelation which might be present in autoregressive models as the equation (4).

Testing for Autocorrelation

Since one of the explanatory variables in equation (4) is the lagged dependent variable, the Durbin-Watson test is irrelevant to detect autocorrelation.

The h-statistic is usually used by researchers in such

(5) The mean value of Bank Credit indicator in financially developed countries in 1999 was around 68%; see Ndikumana (2003), Table (2).

(6) Since equation (4) is a partial adjustment model, the disturbance term is supposed to satisfy the classical assumptions of linear regression. Hence, OLS estimation will yield consistent but probably biased estimates (Gujarati, 2003, 676-678).
cases but to detect for first-order autocorrelation. To allow for higher-order autoregressive scheme in this study, we use the Breush-Godfrey (BG) test, which is considered statistically more powerful than h-test.\(^7\)

Assuming a three-period autoregressive scheme, we run the auxiliary regression of the following general form:

\[
\hat{u}_t = \gamma_0 + \gamma_1 \ln FDB_{t-1} + \
\gamma_2 \ln FDSM_{t-1} + \gamma_3 g_y + \gamma_4 \ln I_{t-1} + \
\rho_1 \hat{u}_{t-1} + \rho_2 \hat{u}_{t-2} + \rho_3 \hat{u}_{t-3} + \epsilon_t,
\]

where \(\hat{u}_t\) are the residuals obtained from estimating equation (4) in the same manner as stated in Table (2). \(\epsilon_t\) is a white noise error term. All other variables remain as defined previously.

Table (3.A) in the appendix summarizes the results of BG test. Each estimation case in the table corresponds to the same case as in Table (2).

It is obvious from the table that there is no autocorrelation in any of the three assumed orders in the regressions in which the Bank Credit entered as the bank-based financial development indicator (panel a), whereas the autocorrelation is present in one case in which the Financial Depth replaces Bank Credit in regressions (panel b).

The results of the BG test increase the credibility of panel (a) estimates.

### 7. DISCUSSION OF RESULTS

Returning back to panel (a) of table (2), the following remarks should be noted:

1) The coefficients of Bank Credit (which represent elasticities) are surprisingly negative in all cases where stock-market based financial development indicators entered the equation alternatively along with other explanatory variables. Two of the three coefficients are statistically significant at the level of 1%, mainly in the cases where stock-market liquidity indicators are included in the estimation.

The partial negative responsiveness of investment to Bank Credit (both as ratios of GDP) is difficult to explain. It would be hard to believe that credit facilities provided to the private sector are actually hindering investment\(^8\). Such unexpected results may suggest that either there is a statistical bias resulted from omitting relevant variables, or there is other economic or behavioral factors.

To check for model-specification errors, we examined plots of the residuals resulted from estimating equation (4), where we found that the plots of the residuals do not exhibit noticeable patterns. Therefore, we may conclude that our model is correctly specified\(^9\).

On the other hand, the unexpected negative coefficients of the “Bank Credit” could possibly be attributed to the following economic and behavioral factors:

First, most of the expansion in the banking credit facilities made to the private sector are of a consumer-credit kind rather than to finance long-term investment projects. Second, investors in Jordan are generally less dependent on external sources in financing their projects. Third, banks in Jordan are generally described as conservative in granting loans to finance relatively high-risk long-term projects.

2) Coefficients of liquidity indicators of the stock market are found to be statistically significant at one percent of significance level and confirm a priori knowledge. The estimated partial elasticities of investment expenditures (as a ratio to GDP) with respect to Turnover and Value Traded were approximately the same, around 11 to 10 percent, respectively.

Although they are relatively low, the estimated values reflect the ability of Amman Stock Exchange to trade the ownership of equities easily and probably with low transaction costs.

The observed positive trend in the liquidity indicators of the stock market in Jordan over the period of study is likely to reflect the increasing role of that market in enhancing domestic investment.

On the other hand, although the estimated coefficient of the Capitalization indicator is positive, it is statistically insignificant. This result indicates that it is not just listing securities in an exchange for what matters in investment, but it is also how such securities are easily traded. Therefore, the size of the stock market is irrelevant in explaining the domestic investment in Jordan.

3) The coefficients of the growth rates in real per capita income are positive but statistically insignificant. This means that in times where growth rates in real per capita income are rising, the fraction of domestic investment out of GDP is not changing significantly. This

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8. A re-estimation of the same equations by using absolute values instead of ratios show negative but statistically insignificant coefficients of “Bank Credit”. The same result applies equally when using ”M_0”. These results may confirm the above-mentioned possible explanations.
9. For further details, see Gujarati (2003), 506-518.
result does not necessarily mean that rising real per capita income does not accelerate investment (in absolute terms) as expected by the “accelerator theory”.(10)

4) As usually the case in most estimations, the lagged investment-GDP ratio have positive and statistically significant coefficients, whose values are slightly greater than 50%. This means that in the absence of any econometric problem it would take at least two years to adjust fully to the desired levels of investment.

To check for the potential bias that may arise due to simultaneity between lagged investment and other explanatory variables, which lag also one period, a re-estimation of equation (4) has been made by replacing the one-lag investment variable with another term lagging for two periods. The results remain stable in terms of the estimated coefficients and the statistical significance of all included variables, except for the estimated coefficient of the replaced variable which became lower.

All estimation cases in panel (a) of table (2) have significant explanatory power and high-enough goodness of fit as F-statistic and adjusted R² indicate.

Replacing Bank Credit by Financial Depth as the indicator of bank-based financial development in the estimation cases of Panel (b) of table (2) yields different results.

Besides the effect direction, the estimated coefficients of Financial Depth are statistically insignificant, which may indicate that either the Financial Depth is not a good indicator of the supply of funds for investment purposes or the demand for investment funding is rather ineffective.

Regarding stock-market financial development indicators, their coefficients are statistically insignificant, which could be related to the high correlation between those variables and Financial Depth. This, in turn, makes it difficult to distinguish between their effect on domestic investment.

Finally, although the coefficient of the lagged investment in the last case is statistically significant, it seems economically implausible.

Robustness of Results

(10) A re-estimation of Table (2) regressions by replacing investment/GDP ratio with investment in absolute terms shows a significant positive impact of growth rates in real per capita income on investment. The estimated coefficients were between 0.95 and 1.36.

Although “OLS” estimates are supposed theoretically to be consistent in our partial adjustment model, we apply the Instrumental Variable Method (4) to confirm our statistical results.

For that purpose, a proxy variable for the lagged dependent variable which enters equation (4) as an explanatory variable shall be found in order to remove any statistical bias that may arise when the lagged dependent variable is correlated with the disturbance term.

The instrumental variable we use in this study is the estimated value of dependent variable of equation (4) resulting from regressing (lnI_t) on all explanatory variables except the dependent variable.

A re-estimation of equation (4) has been made by replacing (lnI_{t-1}) with the estimated values for the six cases yields similar results to what have already been presented in table (2) regarding the signs of bank-based and stock market-based financial development indicators. The significance patterns of our financial development indicators do exhibit some changes in some cases, especially for those of the financial depth coefficients (see table A.4 in the appendix).

On the other hand, the estimated coefficients of the instrumental variable and their significance levels have been dramatically changed.

In addition, the model goodness of fit and its explanatory power have been generally deteriorated as compared to “OLS”. These results increase the credibility of our previously presented findings regarding the relationship between domestic investment and financial development are robust.

8. SUMMARY OF RESULTS AND CONCLUSION

Throughout this study, it is found that liquidity of Jordanian stock market has a positive and statistically significant impact on domestic investment/ GDP ratio. This result indicates that Amman Stock Exchange is an active market and may incur low transaction costs.

It is also found that banking-development indicators are negatively correlated with domestic investment. This surprising result could be attributed partly to the conservative credit policy adopted by banks, which prefer short-term consumer loans to relatively risky long-term investor loans. It may also be explained within the context of investors’ behavior, particularly in their relatively low reliance on external financing by banks.
In addition, it is found that while growth rates in real per capita income do not significantly affect investment/GDP ratio, they do have a large positive and statistically significant impact on absolute levels of investment as the “accelerator theory” suggests.

Finally, coefficients of lagged investment ratios suggest that actual investment spendings need about two years to adjust fully with planned investment patterns.

The main conclusion that may be drawn by this study is that Jordanian banking system does not play an active role in stimulating domestic investment, whereas Amman Stock Exchange does that.

**RECOMMENDATIONS**

Based upon our findings, we suggest first that the government - or the Central Bank - should implement policies which lead to motivate banks to ease lending to entrepreneurs and to small enterprises, and encourage them to take part in direct investment.

Second, there is a need to institutionalize the provision of funds and other credit facilities to the participants in the stock market, especially to those of small investors who suffer at most from market unfavorable fluctuations.
Figure 3. Evolution of Stock-Market Based Financial Development

Table 1. Average annual growth rates of the main variables of the study (1978-2004).

<table>
<thead>
<tr>
<th></th>
<th>Investment/GDP (I)</th>
<th>Gross fixed Capital formation</th>
<th>GDP (in nominal values)</th>
<th>Bank Credit</th>
<th>Financial Depth</th>
<th>Turnover</th>
<th>Value Traded</th>
<th>Capitalization</th>
<th>Real per capita income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated annual growth rate</td>
<td>-0.017</td>
<td>0.063</td>
<td>0.081</td>
<td>0.018</td>
<td>0.018</td>
<td>0.044</td>
<td>0.076</td>
<td>0.032</td>
<td>-0.012</td>
</tr>
<tr>
<td>t-value</td>
<td>-3.42</td>
<td>10.45</td>
<td>32.00</td>
<td>9.08</td>
<td>9.26</td>
<td>3.16</td>
<td>4.69</td>
<td>6.18</td>
<td>-3.82</td>
</tr>
<tr>
<td>Level of significance</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>R²</td>
<td>0.32</td>
<td>0.81</td>
<td>0.98</td>
<td>0.77</td>
<td>0.77</td>
<td>0.29</td>
<td>0.47</td>
<td>0.60</td>
<td>0.37</td>
</tr>
</tbody>
</table>

Note: Average annual growth rates are estimated by using the semi-log specification. For the variable (I), for instance, it is the estimated value of ($\beta_1$) in the following regression: $\ln(I_t) = \beta_0 + \beta_1T + u_t$ where $T$: indicates the time period (year).

$u_t$: disturbance term.
### Table A.1. Values of the study-main variables (1978-2004).

<table>
<thead>
<tr>
<th>Year</th>
<th>Investment/GDP (I)</th>
<th>Bank Credit</th>
<th>Financial Depth</th>
<th>Turnover</th>
<th>Value Traded</th>
<th>Capitalization</th>
<th>Annual real per capita income (Jordan Dinar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1978</td>
<td>.332</td>
<td>.393</td>
<td>.762</td>
<td>.019</td>
<td>.0070</td>
<td>.359</td>
<td>1337</td>
</tr>
<tr>
<td>1979</td>
<td>.327</td>
<td>.453</td>
<td>.786</td>
<td>.034</td>
<td>.016</td>
<td>.460</td>
<td>1395</td>
</tr>
<tr>
<td>1980</td>
<td>.358</td>
<td>.470</td>
<td>.845</td>
<td>.083</td>
<td>.035</td>
<td>.425</td>
<td>1425</td>
</tr>
<tr>
<td>1981</td>
<td>.438</td>
<td>.477</td>
<td>.814</td>
<td>.090</td>
<td>.052</td>
<td>.576</td>
<td>1585</td>
</tr>
<tr>
<td>1982</td>
<td>.379</td>
<td>.516</td>
<td>.850</td>
<td>.123</td>
<td>.077</td>
<td>.627</td>
<td>1615</td>
</tr>
<tr>
<td>1983</td>
<td>.299</td>
<td>.568</td>
<td>.904</td>
<td>.134</td>
<td>.079</td>
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Mean value: 0.265 0.620 1.068 0.144 0.105 0.651 1321

Notes: - Bank Credit = Value of loans made by banks to the private sector divided by GDP; Financial Depth = The stock of broad money divided by GDP; Turnover = The value of the trade of domestic shares at the domestic market divided by the value of listed domestic shares; Value Traded = the value of trades of domestic shares divided by GDP; Capitalization = The value of listed domestic shares on domestic exchange divided by GDP.

- Jordan Dinar equals currently US$ 1.4104.

Source: Own calculations based on published data from the Central Bank of Jordan and the Department of Statistics.

<table>
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<tr>
<th>Variables</th>
<th>Bank Credit</th>
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<th>Turnover</th>
<th>Value Traded</th>
<th>Capitalization</th>
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<td>- Bank-based financial development indicators (in natural log form)</td>
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<td>- Stock-market based financial development indicators (in natural log form)</td>
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<td>- Annual growth rate in real per capita income</td>
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* sig. at 5% level.
** sig. at 1% level

Note: All variables in log-form except the growth rate in real per capita income.

Table A.3. Breusch-Godfrey (BG) Test.

<table>
<thead>
<tr>
<th>Estimation Case</th>
<th>R²ax (auxiliary regression)</th>
<th>(n-p)R²ax</th>
<th>Decision (H0: no autocorrelation)</th>
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<td>6</td>
<td>0.219</td>
<td>4.161</td>
<td>Do not reject H0</td>
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</table>

Notes: H0: \( \rho_1 = \rho_2 = \rho_3 = 0 \)
Reject H0 if \( (n - p) R^2_{ax} > \chi^2_{\alpha=0.05} \) at 5% level of significance.

or, \( (22 - 3) R^2_{ax} > 7.8147 \)
n = 22, \( p = 3 \).
REFERENCES


لاحتفل بالعيد الوطني المالي على التنمية الأثر: الفترة خلال الأردنية الاقتصاد

د. أبو فاضل الحجاج

*ملخص

البحث

1978 - 2004

أثر الأسهم في سوق وفعال في القطاع المالي في التنمية خلال الفترة الأردنية،

من ناحيةً، يمكن أن تكون النتائج غير ذات صلة

بoksen

نُشرت في 2006/5/15 وتصدرت تحت اسم

2007/1/10