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Opening a stock exchange

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ABSTRACT

A large body of theoretical and empirical literature has established a positive relationship between levels of stock market development and economic growth. However, previous empirical work has been based on samples of approximately 40 countries with the most highly developed financial systems. Since 1950, over 70 countries have opened their first national stock exchanges. Can such exchanges increase economic growth? I present a data set of my construction that describes the exchange openings that occurred between 1960 and 1998, and find that these exchanges have generated increases in growth during their first 5 years of existence, although the longer-term results are ambiguous.

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1. Introduction

Many people wonder why a poor country like Malawi should have a stock exchange in the first place. But the reason for having it here is the same as in London or Frankfurt: enabling the private sector to raise capital.

—Rob Stangroom, CEO of Malawi Stockbrokers Ltd.

In roughly the last decade, stock exchanges have opened in some of the least likely places, from Azerbaijan to Zambia. This could be partly due to an influential body of theoretical and empirical literature which has established a positive correlation between the level of financial development and economic growth.¹ Although these studies are based on countries with well developed financial sectors, their conclusions are frequently applied to less developed countries. For example, after finding “large” effects of stock market development on subsequent economic growth in a study of 40 countries covering the period 1980–88, [Atje and Jovanovic \(1993\)](#) conclude that, “if it is true, then it is even more surprising that more countries are not developing their stock markets as quickly as they can as a means of speeding up their economic development (p. 636).”

Given their focus on more established stock exchanges, it is not clear that existing studies are designed to imply such conclusions. For example, in a widely cited empirical study, [Levine and Zervos \(1998\)](#)

find in a sample of 42 countries—primarily developed economies with established stock exchanges—that larger, more liquid stock markets are correlated with higher economic growth. However, their analysis does not address whether a small country without a stock exchange would benefit from opening one.

In this paper, I look at the growth effects of opening a stock exchange directly, by looking at the experiences of 54 countries that opened their first national exchange between 1960 and 1998. Economic growth over at least the first 5 years after the exchange opens is available for 37 of these countries. On average, countries that opened a stock exchange grew faster than a priori similar countries without stock exchanges over the 5 years immediately following the exchange openings. In addition, the countries that opened exchanges were predicted to grow more slowly than similar countries, based on initial levels of GDP per capita, investment, and education. These results hold controlling for additional factors, such as a measure of economic freedom. I also briefly investigate whether this increase in growth is correlated more with increases in investment or with increases in total factor productivity, and whether initial conditions of these markets play any role in determining subsequent success.

[Section 2](#) provides a brief summary of related research, and [Section 3](#) presents the data set of stock exchange openings, along with summary statistics. [Section 4](#) describes the empirical analysis and presents results; [Section 5](#) concludes.

2. Background

In this paper, a stock exchange refers to an established legal framework surrounding the trading of shares. A stock market implies only that shares are traded in a country; i.e., a stock market can exist in a country before a stock exchange is established. Although much of the

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¹ [Levine \(2006\)](#) provides an extensive overview of the literature; prominent theoretical examples include [Bencivenga, Smith, and Starr \(1995\)](#) and [Greenwood and Jovanovic \(1990\)](#), while empirical examples include [Levine and Zervos \(1998\)](#), [Beck and Levine \(2004\)](#), and [Atje and Jovanovic \(1993\)](#).

theoretical literature is concerned only with the existence of a stock market—that is, a secondary market in which shares of companies are traded—this paper is concerned with the formal establishment of a stock exchange.

Most previous research, both theoretical and empirical, has concentrated on the development of existing stock markets, rather than on the initial formation of a stock exchange. In particular, research has focused on the (potential) benefits of increasing a market's size and/or liquidity.² Previous empirical studies that have found positive correlations between stock market development and economic growth include Atje and Jovanovic (1993), Beck and Levine (2004) (which uses panel data), Demirgüç-Kunt and Levine (1996), and Levine and Zervos (1998). These studies have established a fairly robust positive correlation between stock market development and growth in samples of between 40 and 50 countries with the most developed financial institutions.

There are two main theoretical arguments relating the level of development of a stock market to a country's investment and economic growth in papers such as Levine (1991), and Bencivenga et al. (1995).³ Levine (1997) elaborates on these arguments. The first is the "level" effect: by increasing available liquidity, the presence of a stock market increases the stock of funding that can be accessed for investment projects. The regulation that accompanies an official exchange also provides improved accounting and reporting standards, increasing investor confidence; such regulation would seem to be particularly important in attracting non-local investors. The second theory, the focus of Greenwood and Jovanovic (1990), and Obstfeld (1994), is the "efficiency" effect: the existence of a stock market, by providing for better diversification and increased liquidity, increases the allocation of investment directed toward higher return, riskier projects (i.e., those with higher expected growth rates). Opening a stock exchange is expected to both increase the amount of investment available in a country, and to improve the efficiency with which it is allocated. In Section 4, I examine the relative importance of these factors in this sample.

The theoretical extension that a small stock market is preferable to no stock market is straightforward. However, when a country opens its first stock exchange, the exchange is typically much smaller than the smallest of those included in the group of countries studied in previous research.⁴ For example, on the first day of trading on the Tanzanian Stock Exchange in April 1998, four trades took place in the only company listed on the bourse, Tanzania Oxygen Ltd. The number of listings has since increased to four, but trading occurs for only 2 hours per week. The Uganda Securities Exchange opened to trading in January 1998, with no securities listed, only a bond issued by the East African Development Bank (three companies have since listed on the exchange).⁵ Can opening an exchange this small, with such limited trading, have any effect on economic growth?

Theoretically, it is possible for even a small increase in financial development to have a significant impact on economic growth. In a number of models, there is a nonlinear relationship between financial development and economic growth. In Aghion et al. (2005), financial development affects growth by encouraging firms to invest, enabling them to absorb international technology transfer. In Becsi et al. (1999),

² This also includes the highly regarded literature on stock market liberalizations, such as Henry (2000) and Bekaert et al. (2001). While some of the literature on "stock markets and growth" simultaneously considers the banking sector, there is also an extensive literature on the banking sector more specifically, including King and Levine (1993), and Beck et al. (2000).

³ The arguments can easily be extended to the existence of a stock market.

⁴ In other cases, shares have been traded informally for years without an official stock exchange. For example, in the United Arab Emirates, an unregulated informal market operated as early as the 1970s; 36 companies were listed on the exchange when it officially opened in 2000. Regardless of whether an informal market predates the formal exchange, opening a stock exchange should allow for better coordination of buyers and sellers, increasing both the overall level of investment and the efficiency with which investment is allocated.

⁵ The web site <http://www.mbendi.com> provides information on these and other African stock exchanges.

financial structure affects the relationship between aggregate expectations and employment, so small increases in financial development can result in the economy switching to the high-employment equilibrium. In Boyd and Smith (1998), and Bencivenga et al. (1995), equity markets may not be necessary at low levels of economic and financial development, respectively, but can increase growth by affecting firms' technology choices once threshold levels of economic and financial development are attained.⁶ Furthermore, in Boyd and Smith (1998), financial development has the added benefit of increasing the efficiency of the (complementary) debt market. Because of the multiple equilibria nature of many of these models, small improvements in a country's level of financial development can have substantial effects on growth (larger in magnitude than comparable changes in a financially-developed country) when the improvement is enough to move the country past a threshold level of financial development.

Several papers also consider the endogenous formation of financial markets. In Cooley and Smith (1998), financial markets do not form, even when there are no costs to forming, when real interest rates are too low (reducing the incentives for specialization of production). In Greenwood and Smith (1997) financial market development follows a period of overall economic development, because of the costs associated with developing financial markets, while in Boyd and Smith (1998), equity financing becomes more attractive as countries move along their growth paths. Demirgüç-Kunt and Levine (1996) confirm that equity markets historically have developed fairly late in the process of economic development, building on similar observations of Goldsmith (1969), and Gurley and Shaw (1955).

3. Summary statistics: New exchanges

The small size of many new stock exchanges means that data on the size and liquidity of the markets (e.g., capitalization, number of listings, and turnover ratios) are not readily available.⁷ Although the International Finance Corporation maintains a Frontier Markets index, the smallest stock markets included in this index (by companies listed) are Botswana and Bulgaria, with 12 and 15 companies listed as of 1998. Average market capitalization of all countries in the frontier markets index is 1.8 billion U.S. dollars.⁸ Many of the exchanges included in this paper are much smaller; for example, at the end of its first day of trading in 1998, capitalization on Tanzania's stock exchange was U.S. \$10 million.⁹ Although most of the stock markets in the frontier index are fairly new (the oldest are those of Kenya and Bangladesh, established in 1954 and 1956 respectively), the index excludes both smaller and/or less successful new markets (such as Bolivia and Honduras) and new stock markets that have been more successful or are in more developed countries (such as Costa Rica and Iceland).

The countries that have opened their first stock exchange since 1960 are quite diverse. At the year of the stock market opening, GDP per capita (in constant US dollars) ranged from \$162 in Malawi to \$32,860 in Kuwait.¹⁰

Table 1 demonstrates the diversity of exchanges that opened between 1960 and 1998. The year of the opening, the number of listed companies at the opening (where possible), and whether the exchange was established primarily by government or private sector initiative summarize the formation of these exchanges (sources and further

⁶ Rioja and Valev (2004) and Minier (2003) employ different methodologies, but both find empirical evidence of such a relationship.

⁷ Demirgüç-Kunt and Levine (2001) is a substantial improvement in this area, providing financial market data for a much larger sample of countries, although stock market data for many countries are not available until the mid-1990s.

⁸ Frontier Stock Markets Review, IFC (Washington, D.C.), 1998; data are for March 1998.

⁹ <http://www.MBendi.com>.

¹⁰ Median GDP per capita was \$1352; 25% of countries had GDP per capita below \$421, and 25% had GDP per capita above \$2912. Data are from the World Bank, World Development Indicators, and are available for the period 1960–98 (data are available for 69 countries).

Table 1
Stock exchange openings 1960–98.

| Country | Date | GDP | GDP growth | | Initial listings | Estimated |
|---------------------|------|--------|------------|-------|------------------|-----------|
| | | | Prior | Post | | |
| Nigeria | 1961 | 218 | – | 5.8 | 19 | Govt |
| El Salvador | 1965 | 1562 | 5.9 | 1.6 | | |
| Iran | 1968 | – | – | – | 0 | Govt |
| Jamaica | 1969 | 1635 | 3.9 | 1.7 | 34 | Both |
| Tunisia | 1969 | 977 | 8.2 | 8.8 | 13† | Govt |
| Ecuador | 1970 | 879 | –0.6 | 12.3 | Few | Govt |
| Bermuda | 1971 | 22,673 | 4.4 | 2.2 | 33† | |
| Kuwait | 1972 | 32,860 | 0.6 | –14.6 | 32† | Govt |
| Thailand | 1975 | 863 | 1.5 | 7.1 | 14 | Govt |
| Costa Rica | 1976 | 2290 | –0.5 | 3.1 | 13† | Priv |
| Cote d'Ivoire | 1976 | 1124 | 4.0 | 6.7 | 22† | Govt |
| Jordan | 1978 | 1425 | 2.7 | 14.6 | 66 | Govt |
| Trinidad and Tobago | 1981 | 4712 | 4.5 | –7.0 | 29 | Govt |
| Saudi Arabia | 1985 | 7437 | –8.0 | –6.3 | 59† | Govt |
| Iceland | 1986 | 25,270 | 2.4 | –1.6 | 0 | Both |
| Barbados | 1987 | 7017 | 9.2 | 4.4 | 5 | Govt |
| Bahrain | 1989 | 8683 | 7.4 | 3.5 | 29 | Govt |
| Bolivia | 1989 | 817 | 0.7 | 2.8 | 2† | Both |
| Botswana | 1989 | 3007 | 10.4 | 4.3 | 5 | Govt |
| Mauritius | 1989 | 2778 | 6.0 | 3.3 | 5 | govt |
| Oman | 1989 | 5358 | 3.0 | 0.8 | 50† | Govt |
| China | 1990 | 349 | 2.5 | 12.9 | 13 | Govt |
| Ghana | 1990 | 352 | 1.8 | 1.0 | 11 | Both |
| Honduras | 1990 | 682 | 1.2 | 2.5 | 1 | |
| Hungary | 1990 | 4857 | 1.2 | –2.9 | 1 | |
| Panama | 1990 | 2523 | –0.5 | 6.2 | 13† | Govt |
| Russia | 1990 | 3668 | 1.4 | –14.6 | 13† | |
| Slovenia | 1990 | 9659 | – | –5.2 | 11 | |
| Swaziland | 1990 | 1446 | 5.8 | –1.8 | 1 | Both |
| Croatia | 1991 | 4281 | – | –8.0 | 2† | Priv |
| Dominican Republic | 1991 | 1352 | –7.8 | 1.1 | 0 | Govt |
| Poland | 1991 | 2731 | –5.3 | 4.0 | 5 | Govt |
| Uzbekistan | 1991 | 1303 | –0.4 | –4.5 | 0 (?) | |
| Iraq | 1992 | | | | 69 | |
| Namibia | 1992 | 2165 | 7.5 | 3.9 | 3 | Priv |
| Ukraine | 1992 | 1620 | –8.9 | –22.6 | 122 | Govt |
| Czech Republic | 1993 | 4651 | –0.6 | 6.0 | 7 | Govt |
| Lithuania | 1993 | 1981 | –21.3 | 3.5 | 19 | Govt |
| Slovakia | 1993 | 2912 | –7.1 | 7.2 | 11 | Govt |
| Nepal | 1994 | 204 | 1.3 | 2.8 | 72 | Govt |
| Nicaragua | 1994 | 421 | –3.2 | 1.9 | 0 | Govt |
| Paraguay | 1994 | 1821 | 1.4 | –1.3 | 3† | |
| Suriname | 1994 | 789 | –3.3 | – | 11† | Priv |
| Zambia | 1994 | 406 | 3.8 | 3.8 | 5 | Govt |
| Kyrgyz Republic | 1995 | 737 | –19.9 | 8.5 | 10 | |
| Latvia | 1995 | 1949 | 2.1 | 9.6 | 17 | |
| Moldova | 1996 | 713 | –1.2 | –8.3 | 11 | |
| Mongolia | 1995 | 390 | 0.3 | 2.2 | 461 | Govt |
| Romania | 1995 | 1448 | 4.1 | –6.4 | 9 | Govt |
| Sudan | 1995 | 270 | 2.0 | 4.5 | 24 | Govt |
| Albania | 1996 | 809 | 7.5 | 6.9 | 0 | |
| Armenia | 1996 | 810 | 6.6 | 6.9 | 9 | |
| Azerbaijan | 1996 | 378 | –12.8 | 9.0 | 0 | |
| Cyprus | 1996 | 12,263 | 5.1 | 4.1 | 42 | Govt |
| Estonia | 1996 | 3387 | 5.3 | 4.6 | 11 | Both |
| Fiji | 1996 | 2603 | 0.8 | –4.7 | 4† | |
| Kazakhstan | 1996 | 1258 | –6.9 | –0.9 | 0 | |
| Macedonia | 1996 | 1306 | 8.0 | 2.7 | 2† | |
| Malawi | 1996 | 162 | 12.3 | 0.6 | 1 | Govt |
| Bulgaria | 1997 | 1317 | –9.7 | – | 0 | Govt |
| Cayman Islands | 1997 | | | 2 | | |
| Qatar | 1997 | – | – | – | 22† | Govt |
| Uganda | 1997 | 324 | 5.9 | – | 0 | Govt |
| Tanzania | 1998 | 173 | 1.3 | – | 1 | Govt |

Notes to Table: "Date" gives the year in which the stock exchange opened to trading. GDP per capita is in constant US dollars at the year of the opening (source: World Bank). Growth is 1-year percentage growth of GDP per capita; growth "prior" begins 2 years before the opening, and growth "post" begins the year after the opening. The number of companies listed at the time of the opening is domestic companies listed on the official market. † indicates that the listing data is not for the year of the opening; it is as close as possible and identified in Appendix B. Sources are given in Appendix B.

details are described in Appendix B). In addition, GDP per capita at the year of the opening, and growth in GDP per capita immediately prior to and following the opening are included. GDP growth is annual percentage growth; growth prior to the opening is measured beginning 2 years before the opening, while growth after the opening is measured from the year following the opening. (For example, El Salvador's stock exchange opened in 1965; prior growth covers the period 1963–64 while subsequent growth covers 1966–67.)

Several features stand out in Table 1. First, there has been an explosion in the number of exchanges opened since 1989; although 16 exchanges opened between 1960 and 1988, 49 opened between 1988 and 1998.¹¹ Second, there is a range of experiences in GDP per capita, growth rates before and after opening the exchange, and in the number of companies listed at the time of the opening. Finally, most of the exchanges have been opened by government initiative.

Given these varied experiences, two questions arise. First, what is the average effect of opening an exchange? In particular, is there (on average) a measurable effect on growth? Second, are there factors—either in the economy as a whole or in the structure of the exchange—that affect the success of new exchanges? I address both in the following section.

4. Empirical analysis

In this section, I address the empirical implications of opening a stock exchange in three ways. First, I compare the average growth experience of countries that open a stock exchange directly to a priori similar countries that do not open an exchange. Next, I examine whether the differences in growth experiences are due more to increases in levels of investment or increases in productivity (or the allocation of investment). Finally, I compare the performance of new exchanges based on the country's income level, number of companies listed at the time of the exchange opening, and whether the exchange was established by the private sector or by the government.

4.1. Predicted vs. actual growth rates

In this section, I directly compare countries that opened a stock exchange to a priori similar countries that did not. I do this by constructing a "control group" for each country that opens a stock exchange. Structuring the analysis in this way allows me to approximate a controlled experiment to estimate the counterfactual: that is, what would a country's growth experience have been had it not opened the stock exchange? For a country without a stock exchange that is considering opening one, this counterfactual is more relevant than the overall comparison between (highly developed) financial market indicators and economic growth.

GDP data in this section are taken from the World Bank, which gives GDP per capita in constant U.S. dollars. Empirical work in economic growth generally uses the Penn World Tables data, which are adjusted for purchasing power parity. Although the correlation between World Bank and Summers–Heston GDP in a given year is not generally high, the correlation between growth rates is very high (see Collins and Bosworth, 1996). I use the World Bank data because they allow me to examine five-year growth rates for a wide range of countries that opened stock exchanges as late as 1993.¹²

For each country that opens a stock exchange, I construct a control group. Each control group includes countries that, prior to the opening of the stock exchange, had approximately the same levels of income per capita as the country opening the exchange, but did not have

¹¹ This does not include the seven West African countries that opened a regional exchange together—the first national exchange for all but one of them—in 1998.

¹² Although the currently available (beta) version of the Penn World Tables (6.0) expands coverage through 1998, its country coverage is substantially smaller than the World Bank data.

exchanges of their own.¹³ Furthermore, the countries in the control groups did not open an exchange during the time periods under observation. That is, a country in a control group that opened a stock exchange 8 years after the original country would be included in the 5-year control group, but not in the 10-year control group.

The existing theoretical literature does not provide much guidance on the determinants of the decision to open a stock exchange. However, it seems plausible that this decision is correlated with factors that may affect growth. For example, expected high growth rates increase the returns to opening a stock exchange. (In practice, the correlation could also work in the other direction, as a country experiencing a prolonged recession may open a stock exchange in an effort to stimulate growth.) To partly control for this, I estimate predicted growth rates (based on variables observed at the beginning of the period) for comparison to actual growth rates. This also allows me to control for differences in investment rates and education levels between control groups and the countries that open stock exchanges, while maintaining reasonable degrees of freedom.

Table 2 presents mean values of predicted and actual log growth rates for the countries that opened stock markets and their control groups. Predicted log growth rates are based on a regression of growth on the log of initial GDP per capita, initial secondary school enrollment rates, and the initial investment ratio. To control for potential differences across control groups, this regression is estimated separately on each control group. The country that opened a stock market is excluded from the regression, in order to better predict its growth experience in the absence of a stock market.

In Table 2, standard errors are standard errors of the means, and control group observations are weighted by the inverse of the number of observations in each control group, and rescaled to the actual sample size. Since the samples being compared (the countries that opened stock exchanges, and the control group countries) are drawn from populations with possibly different variances, statistical significance is estimated using Welch's approximation to the Behrens-Fisher problem (see Bickel and Doksum, 1977, and Scheffe, 1970).

The countries that opened a stock exchange were predicted to grow significantly more slowly over the first 5 years after the opening than their control groups (−0.106 to −0.035). In fact, these countries grew faster than their control groups and faster than predicted. The difference between the means of the countries opening exchanges and the control groups is statistically significant (at the 90% level using Welch's approximation). This difference translates into an annual difference of 1.6 percentage points; over 5 years, the difference is 7.8 percentage points.

For periods longer than 5 years, sample sizes are reduced substantially and none of the results is statistically significant. Over the ten-year period, countries that opened exchanges were again predicted to grow more slowly than their control groups, on average, and the average of their actual growth rates is lower than predicted. Over 15 years, despite being predicted to grow faster than the control groups, the countries that opened exchanges grew more slowly on average. Over 20 years, the countries that opened stock exchanges were predicted to grow faster than their control groups, and they grew faster than predicted.

Of course, the difference in results over different periods can be attributed partly to the changing sample composition. Since many countries opened stock exchanges in the 1989–92 period, comparable GDP data have not yet been made available to examine growth rates over periods longer than 10 years.¹⁴

¹³ "Approximately" means that GDP falls in the same third of the GDP distribution as the country that opened a stock exchange; the construction of the control groups is discussed in more detail in Appendix A. More rigorous specifications—restricting by regions or school enrollment rates—do not qualitatively affect the results, but control groups are much smaller.

¹⁴ Results for the six countries with data available over 20 years are not statistically significant over any time period. Over five years, these countries grew faster (on average) than their control groups and faster than predicted, but were predicted to grow faster than the average of their control groups.

Table 2
Actual vs. predicted growth rates.

| | Open stock exchange | Control groups |
|----------------|---------------------|----------------|
| 5-year growth | 0.043 (0.236)* | −0.035 (0.277) |
| Predicted | −0.106 (0.245)* | −0.035 (0.219) |
| Observations | 34 | 467 |
| 10-year growth | 0.026 (0.436) | 0.152 (0.299) |
| Predicted | 0.107 (0.362) | 0.152 (0.209) |
| Observations | 12 | 125 |
| 15-year growth | 0.045 (0.568) | 0.106 (0.399) |
| Predicted | 0.212 (0.331) | 0.106 (0.306) |
| Observations | 9 | 90 |
| 20-year growth | 0.335 (0.548) | 0.130 (0.476) |
| Predicted | 0.230 (0.345) | 0.130 (0.339) |
| Observations | 6 | 52 |

Notes to Table: Growth rates are log difference in GDP over the period (e.g., $\log(x_{t+5}) - \log(x_t)$). Predicted growth rates are predicted log difference in GDP, where the prediction is based on a regression on initial log GDP, initial investment, and initial education enrollment ratios on the control group excluding the country opening a stock market. Standard deviations of the means appear in parentheses. * indicates that the mean of the countries opening a stock market is statistically different from the mean of the control groups at the 90% level, based on Welch's approximate degrees of freedom and *t*-statistic. Over the five-year period, the difference between predicted and actual growth rate means for the countries that opened stock markets is statistically significant at the 95% level.

Opening a stock exchange is often associated with a number of economic reforms. Because of the way that the control groups are constructed, it is possible that the countries that opened stock exchanges had stronger market orientations generally (e.g., fewer trade restrictions, less government interference) than their control groups did. The results of Table 2 could be driven by higher levels of economic freedom in countries that open stock exchanges than in countries that do not; opening a stock exchange may be one manifestation of a liberal economic agenda and, as such, may be correlated with economic growth without directly affecting growth.

To partially control for this possibility, I further restrict the control groups based on an index of economic freedom constructed by Gwartney et al. (2000).¹⁵ This restriction reduces the sample sizes considerably, since the index begins in 1970 and is not available for all countries.

The index is available every 5 years.¹⁶ Over each period, countries are omitted from the control group if either the economic freedom data are missing or if their economic freedom index is more than one standard deviation lower than the country that opened a stock exchange. There is no restriction on control group observations being more free economically than the country that opened a stock exchange. The economic freedom index ranges from one to ten (ten is most free economically), and in each period, the standard deviation is between 1.5 and 1.7. Table 3 repeats the analysis of Table 2 with the control groups restricted from being substantially less free economically than the country that opened a stock market.

Although sample sizes of both countries that opened stock markets and control groups are reduced, the five-year results of Table 2 are confirmed. Countries that opened a stock exchange were predicted to grow more slowly, on average, than their control groups; in fact, they grew faster. The difference in actual growth rates is statistically significant at the 90% level.¹⁷ Results over 10 years are also similar to

¹⁵ The authors describe the index as "designed to identify the consistency of institutional arrangements and policies with economic freedom." The index is constructed using principal component analysis from 23 components relating to the size of government, economic structure and the use of markets, monetary policy and price stability, the freedom to use alternative currencies, the legal structure and security of private ownership, the freedom to trade with foreigners, and freedom of exchange in capital markets.

¹⁶ The most recent value is used to construct the revised control groups; for example, 1975 data are used to construct the control group for Jordan, which opened its exchange in 1978.

¹⁷ When standard degrees of freedom are used, the difference in actual growth rates is statistically significant at the 95% level, and the difference in predicted growth rates at the 90% level. Welch's approximation is used since it allows for different distributions between the two samples. The difference in the means of actual and predicted growth rates for the countries that opened a stock exchange is statistically significant at the 90% level under standard assumptions. These results apply to the five-year period only.

Table 3
GDP growth rates: economic freedom restriction.

| | Open stock exchange | Control groups |
|--------------------------|---------------------|----------------|
| 5-year growth | 0.095 (0.219)* | −0.007 (0.184) |
| Predicted | −0.108 (0.332) | −0.007 (0.148) |
| Observations | 14 | 106 |
| 10-year growth | 0.212 (0.226) | 0.057 (0.323) |
| Predicted | 0.139 (0.176) | 0.057 (0.253) |
| Observations | 3 | 22 |
| 15-year growth | 0.844 | −0.176 (0.292) |
| Predicted | −0.186 | −0.197 (0.066) |
| Observations | 1 | 8 |
| Initial economic freedom | 5.11 (1.29) | 5.22 (1.03) |
| Observations | 14 | 106 |

Notes to Table: Growth rates are log difference in GDP per capita. To compute control group means, each observation is weighted by the inverse of the number of observations in that control group; the sample size is rescaled to the original sample size. Standard deviations of the means appear in parentheses. * indicates that the mean of the countries opening an exchange is statistically different from the control group mean at the 90% level using Welch's approximate degrees of freedom.

those in Table 2. Over 15 years, only one country that opened a stock exchange (Thailand) has data for both its growth rate and economic freedom index; it grew much faster than its control group average and much faster than its predicted growth rate.

4.2. Investment and productivity

The results presented in Tables 2 and 3 provide evidence that countries that opened stock markets grew faster, on average, than a priori similar countries that did not open exchanges, and that this difference is due to more than differences in initial conditions. However, the analysis thus far cannot identify the channel(s) through which this growth effect occurs. In this section, I investigate two such channels: investment and productivity growth.

At the time of the stock market openings, investment ratios were comparable, on average, between the countries that opened exchanges and their control groups. The average ratio of gross domestic investment to GDP in the countries that opened stock exchanges was 21.7, while the average ratio among the control group countries was 23.5.¹⁸

To investigate whether opening a stock exchange generated increased investment or productivity growth (or both), I investigate the evolution of investment and estimated productivity growth over time for the countries that opened stock exchanges and their control groups. The data for this analysis are from Collins and Bosworth (1996).

Their data are the estimated contributions of physical capital, skill-adjusted labor, and estimated total factor productivity (TFP) growth to GDP growth. Their estimated index of TFP growth is:

$$\frac{\dot{A}_t}{A} = \frac{\dot{Y}_t}{Y} - s_K \frac{\dot{K}_t}{K} - s_L \frac{\dot{L}_t}{L} \quad (1)$$

where Y_t is GDP at time t , K_t is the capital stock, and L_t is skill-adjusted labor. Capital's share of income (s_K) is assumed to be 0.35. Note that the contribution of total factor productivity to output is measured in percentage-point increases in GDP (e.g., the contribution of TFP could increase because growth has increased or because the contribution of TFP to growth has increased).¹⁹

Table 4 presents average levels of investment and productivity. Collins and Bosworth (1996) normalize data to equal one in 1960; in

Table 4, data are normalized to one for the year that the exchange opens. Relative to the time of the stock market opening, the contribution of physical capital to GDP ("Investment") increases fairly steadily for both the countries that opened exchanges and their control groups. The increases over each time period are very similar for the two groups, suggesting a general upward trend in investment that is not much affected by the opening of a stock exchange.

For TFP growth, the results are quite different. Over 5 years, TFP growth increases in the countries that open a stock exchange, while it decreases (on average) in the control group countries. This difference is marginally statistically significant (90% level) using Welch's approximate degrees of freedom. However, the results over longer time periods vary; over periods of 10 and 15 years, productivity growth is lower in the countries that opened a stock exchange than in the control groups, but these results are reversed over 20 years. None of these differences is statistically significant. Productivity growth is lower, on average, for all countries (both those that opened exchanges and the control groups) for all periods longer than 10 years.

Taken together, these results suggest that the increase in short-run (i.e., five-year) growth seen in countries that opened stock exchanges is more likely due to increased TFP growth—perhaps because of more efficient allocation of investment—than to increases in investment. In a panel study covering industries in 65 countries, Wurgler (2000) finds that countries with more developed financial sectors allocate more investment to expanding industries, and less to declining industries. The ambiguity of the longer-term results is not surprising, since no clear difference in growth rates over periods of longer than 5 years emerged from Tables 2 and 3.

4.3. Characteristics of successful new exchanges

While countries that opened stock exchanges grew faster, on average, than similar countries that did not, this was not universally the case. In this section, I provide a preliminary examination of some factors that could affect the success of newly opened exchanges in generating increased growth. I test three possible explanatory factors: whether the exchange was opened by the government or by private interests; the size of the market at the opening; and the level of GDP per capita of the country.

Although most exchanges were opened by governments, some were established by private initiative. For example, the Namibian

Table 4
Investment and productivity.

| | Open stock exchange control | Groups |
|---------------------|-----------------------------|-------------|
| <i>Investment</i> | | |
| 5 years | 1.06 (0.05) | 1.03 (0.07) |
| Observations | 18 | 185 |
| 10 years | 1.11 (0.06) | 1.11 (0.11) |
| Observations | 10 | 116 |
| 15 years | 1.16 (0.15) | 1.14 (0.16) |
| Observations | 9 | 114 |
| 20 years | 1.23 (0.27) | 1.15 (0.21) |
| Observations | 7 | 100 |
| <i>Productivity</i> | | |
| 5 years | 1.04 (0.16)* | 0.98 (0.17) |
| Observations | 18 | 185 |
| 10 years | 0.95 (0.22) | 1.02 (0.28) |
| Observations | 10 | 116 |
| 15 years | 0.91 (0.28) | 0.95 (0.30) |
| Observations | 9 | 114 |
| 20 years | 0.98 (0.34) | 0.94 (0.40) |
| Observations | 7 | 100 |

Notes to Table: To compute control group means, each observation is weighted by the inverse of the number of observations in that control group; the sample size is rescaled to the original sample size. Standard deviations of the means appear in parentheses. * indicates that the means are statistically different at the 90% level, based on Welch's approximate degrees of freedom. Data source: Collins and Bosworth (1996).

¹⁸ Standard deviations are 6.7 and 9.5 respectively; data are available for 34 countries that opened exchanges and for 652 control group countries. Control group observations are weighted by the inverse of the number of the countries in the control group. Data source: World Bank.

¹⁹ See Collins and Bosworth (1996) for a more detailed description of the construction of their data.

stock exchange was formed in 1992 by a group of businesses and individuals who each put N\$10,000 toward the startup funds for the exchange.²⁰ It seems plausible that the fact that private businesses and/or individuals have established a stock exchange indicates that sufficient demand exists for the services of a stock exchange, and that conditions for growth are favorable. This suggests that a possible factor in subsequent growth rates is whether the exchange was established primarily by private or government initiative.

In fact, there is no observable difference in growth rates, relative to control groups, between countries in which stock exchanges were established by government initiative and those in which private initiative established the exchange. The first panel of Table 5 presents actual, predicted, and control-group growth rates for the 22 countries in which stock exchanges were established by the government, and eight countries in which exchanges were established either by private initiative or by a coalition of public and private interests.²¹ Over 5 years, the growth patterns for these subsets of countries are identical to the results presented in earlier tables: the countries that opened stock exchanges were predicted to grow more slowly than their control groups, and in fact grew faster. The magnitudes of the means of both predicted and actual growth rates are nearly identical for the two groups.

This does not provide any evidence of a systematic difference in growth rates related to whether the private sector or government initiated the exchange. (Governments, of course, are free to consult with the private sector, and the original impetus for opening a stock exchange may frequently come from the private sector, even when the government officially establishes the exchange.)

Another way of measuring whether a country was “ready” to open a stock exchange could be the number of companies listed at the time of opening. A country with a stock exchange that opened with only two companies able to meet its listing requirements, for example, seems less likely to benefit from the exchange than a country with a stock exchange that opened with 40 listed companies. For Table 5, I divided the sample into two groups, based on the number of companies listed at the time that the exchange opened. The median number of companies listed is 12; the range is from zero (Dominican Republic, Uzbekistan, and Iceland) to 122 (Ukraine). Results appear in the second panel of Table 5.

Perhaps surprisingly, the countries with fewer companies listed at the time of opening grew faster than the countries with more companies listed. This suggests that opening a stock exchange before a large number of companies are qualified to list on the exchange may not be a serious detriment to subsequent growth rates. In fact, the evidence suggests the opposite. When a country is able to open a stock exchange with a large number of listed companies, it could be because widespread, although informal, share-trading already exists in the country, and the exchange only formalizes such trading. This could be less likely to generate an increase in growth rates than an exchange that provides a country with its first opportunity for a share market.

Another potential measure of the “readiness” of a country to open a stock exchange is its level of GDP per capita. For example, in Greenwood and Smith (1997), economic development precedes the endogenous development of financial markets. As a preliminary examination of this hypothesis, the third panel of Table 5 presents growth rates when the sample is split at the median level of GDP per capita at the time of the exchange opening (\$2165).

The results presented earlier are confirmed for both subsamples: countries that opened a stock exchange grew faster, on average, than their control groups, although they were predicted to grow more slowly. Growth rates, both predicted and actual, are higher on average for the low-income subsample than for the high-income countries

Table 5
Growth rates by exchange characteristics.

| | Open stock exchange | Control groups |
|--|---------------------|----------------|
| Opened by government initiative | | |
| 5-year growth | 0.049 (0.281) | −0.042 (0.289) |
| Predicted | −0.083 (0.197) | −0.042 (0.234) |
| Observations | 22 | 276 |
| Opened at least partly by private initiative | | |
| 5-year growth | 0.044 (0.048) | −0.024 (0.253) |
| Predicted | −0.079 (0.200) | −0.024 (0.188) |
| Observations | 8 | 126 |
| Fewer than 12 companies listed at opening | | |
| 5-year growth | 0.078 (0.162) | −0.086 (0.281) |
| Predicted | −0.179 (0.280) | −0.086 (0.217) |
| Observations | 16 | 211 |
| More than 12 companies listed at opening | | |
| 5-year growth | 0.008 (0.317) | 0.009 (0.278) |
| Predicted | −0.025 (0.197) | 0.009 (0.223) |
| Observations | 15 | 207 |
| Initial GDP ≤ \$2165.20: | | |
| 5-year growth | 0.077 (0.262) | −0.018 (0.263) |
| Predicted | −0.053 (0.280) | −0.018 (0.197) |
| Observations | 17 | 297 |
| Initial GDP > \$2165.20 | | |
| 5-year growth | 0.010 (0.210) | −0.052 (0.290) |
| Predicted | −0.160 (0.198) | −0.052 (0.239) |
| Observations | 17 | 170 |

Notes to Table: Control group observations are weighted by the inverse of the number of countries in the control group. Standard deviations of the means appear in parentheses.

(perhaps reflecting a tendency toward income convergence in the sample as a whole). However, the magnitude of the difference between average growth rates and control group growth rates is higher for the low-income countries. This does not provide support for the idea that a stock exchange benefits high-income countries more than low-income ones (at least, not when countries are divided into rich and poor at a level of approximately \$2200). As in the case with the number of companies initially listed, this may be due to (informal) pre-existing trading opportunities in the high-income countries.

5. Concluding remarks

This paper provides some evidence that, despite the small size of most newly opened exchanges, opening a stock exchange is positively correlated with subsequent growth rates, at least over the first 5 years of the exchange's existence. This is true controlling for development levels, predicted growth rates, and a measure of economic freedom. Furthermore, this seems to be a result of increased productivity growth (e.g., a more efficient allocation of investment), rather than increased levels of investment.

Although these results generally confirm previous empirical research in finding that “finance is good for growth,” the approach taken in this paper provides a more relevant policy implication for a country without a stock exchange: opening a stock exchange—even a small and fairly illiquid one—is correlated with higher rates of economic growth, on average. In addition, these results are not limited to initially richer countries, or those with many companies able to list at the time of opening: poor countries and countries in which only a few companies list on the new stock exchange also seem to benefit. There is virtually no difference in growth rates for countries in which the exchange was established by private initiative relative to those in which the government undertook its establishment.

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²⁰ See <http://www.MBendi.com>.

²¹ Table 1 includes whether exchanges were established by private or government initiative, or both.

Appendix A. Construction of control groups

For each year, the universe of countries with no history of a stock exchange prior to that year was divided into three categories of GDP per capita, with divisions at the 33rd and 67th percentiles. Control groups consist of countries falling within the same range of income as the country under investigation. The income range for countries in which income falls within 10% of the 33rd and 67th percentile is determined by the midpoints of the relevant quantiles (e.g., between the 17th percentile and the median if income is within 10% of the 33rd percentile).

Income for this construction is based on the year prior to the stock market opening. Growth is measured from the year of the opening.

Countries that subsequently opened a stock market are included until that time. For example, Thailand opened a stock market in 1975. A country in its control group that opened a stock market in 1987 would be included in the control group estimate for five- and ten-year growth (1975–80 and 1975–85), but not for fifteen-year growth.

More rigorous specifications of the control groups include, in addition to the GDP restrictions and the absence of a stock market, restricting the control groups to the region of the world of the country opening a stock exchange and including secondary school enrollment rates in the specification. Qualitative results do not differ substantially and the control groups are much smaller (reducing statistical significance).

Appendix B. Details and sources

"Website" as a source refers to the stock exchange's website. Web addresses are available from the author.

Albania: First stock exchange opened May 1996 by National Bank, initially offered treasury bills and privatization vouchers (Albanian Times, May 3 1996, FEAS).

Armenia: Established 1993, listing and trading began 1996, 9 companies traded 1996 (FEAS). Azerbaijan: Stock exchange established 1991, actively initiated September 1996 with treasury bills (website).

Bahamas: Opened May 2000, 11 companies listed by end of May 2000 (website).

Bahrain: Government and IFC undertook feasibility study, exchange opened June 1989 with 29 companies listed (website).

Bangladesh: Formal trading began 1956 (website), suspended 1971–76 during liberation war.

Barbados: Established June 1987 (under Securities Exchange Act of 1982) with 5 companies initially listed and 9 listed by end of 1987 (website).

Benin: See BRVM.

Bermuda: Established 1971 (website); 33 companies listed 1997 (IFC).

Bolivia: Operations began October 1989 following discussion initiated in 1976 by private individuals and subsequent government intervention (website); 2 companies listed in 1994 (IFC).

Botswana: Operations began June 1989 with 5 listed companies, initiated by companies that had already listed shares and the Botswana Development Corporation (website, MBendi).

BRVM (Bourse régionale des valeurs mobilières): Regional bourse linking eight French-speaking countries of West African Economic and Monetary Union opened in September 1998. Cote d'Ivoire had pre-existing exchange (closed in December 1998), and all companies originally listed on the regional bourse were Ivoirian. A company from Senegal listed during the first year of operation (MBendi).

Bulgaria: numerous unregulated regional exchanges began in 1991; merged into Bulgaria Stock Exchange 1995. Legislation established listing requirements; stock exchange closed since no companies met requirements. First trading after license granted October 1997; first company listed on official market 1998. (website).

Burkina Faso: See BRVM.

Cape Verde: Stock exchange expected 1998.

Cayman Islands: Stock exchange opened 1997 (CIA World Factbook); 2 companies listed 1997 (IFC).

China: previous 1920–49, Shanghai opened 1990 and Shenzhen opened 1991 (SSB, Yao, 1998); 13 companies listed 1990 (Park and van Agtmael, 1993); Shanghai Securities Exchange opened with 8 traded stocks, designed to operate in China's unique political-economic system (Hertz, 1998); first (modern) public issue of securities 1984, first centralized exchange 1990 ((George, 1989).

Costa Rica: Businesspeople founded; operations started in August 1976 Costa Rica Development Corporation established (website); 13 companies listed 1980 (IFC).

Cote d'Ivoire: Established in 1974, trading began in 1976 (MBendi); 22 companies listed 1980 (IFC); created to encourage domestic investment and provide access to international financial market (U. S. Library of Congress).

Croatia: 25 banks and insurance companies established "non-governmental, not-for-profit" stock exchange in July 1991; exchange existed 1918–31 (website); 2 companies listed 1992 (IFC).

Cyprus: Established by government in 1993, operations began March 1996 (website); extensive unofficial over-the-counter market operated under auspices of Cyprus Chamber of Commerce until mid-March 1996, 42 companies listed December 1992 (Cyprus Investment and Securities Corporation Ltd., Stock Market Review 1996: <http://www.bankofcyprus.com/cisco/>).

Czech Republic: 7 securities issued on first day of trading in April 1993, coupon privatization program began in 1993 (website); previous exchange closed 1938 and abolished 1952 (Stanley, 1995).

Dominican Republic: Operations began in 1991, established by legislation in 1989, equities not originally traded (website).

Ecuador: First trading August 1970, in first year, equities 3.5% of trades (website); 65 companies listed 1992 (IFC).

El Salvador: Stock exchange established 1965, closed early 1970s. Businesspeople opened later stock exchange in 1992 (website).

Estonia: founded by collection of commercial banks, brokerage firms, and state actors, 11 securities listed when opened for trading in May 1996, previous exchange 1920–41 (website).

Fiji: Stock exchange established 1979 as wholly-owned subsidiary of Fiji Development Bank, active trading began July 1996 when call market established (website); 4 companies listed 1994 (IFC).

Georgia: Founded 1999 and licensed January 2000, initiated by private companies and agencies interested in the structure of the securities market, with assistance from USAID (website), 8 companies listed in first 3 months of trading (U.S. Embassy, Tbilisi).

Ghana: Operations began November 1990 (website, MBendi); originally 11 companies listed, joint government and private initiative (MBendi; World Investment News interview with Yeboa Amoa, Managing Director, 1999: <http://www.winne.com>); privatization has aided stock market development (SSB).

Guatemala: Authorized 1987 (website); 7 companies listed 1995 (IFC).

Guinea-Bissau: See BRVM.

Honduras: Authorized by government in 1990, operations began August 1990 with 1 company listed (website); 26 companies listed 1991 (IFC).

Hungary: trading in 1 officially quoted stock began in June 1990 (Warsaw Voice, Sept. 28, 1997; no. 39 (466)); unofficial trading began early 1988 (Stanley, 1995); previous exchange 1864–1948, 5 companies listed by end of 1990 (Price, 1994).

Iceland: joint venture of several banks and brokerage firms, at the initiative of the Central Bank, trading began in 1996, initially only in T-bonds (website).

Indonesia: Dutch companies traded on exchanges 1912–42; stock exchange opened 1952 listing mainly government bonds and stocks in Dutch companies (ASAC, 1988).

Iran: Opened 1968, initially trading only government bonds and certain State-backed securities (website, FEAS); first shares listed late 1968 (Robbins and Stobaugh, 1976).

Iraq: First stock exchange inaugurated March 1992 with 69 listed companies (OPEC, OPEC Bulletin, April 1992).

Israel: Unofficial stock exchange dates to 1935, authorities established official stock market that began operations in 1953 (website).

Jamaica: privately founded by four founding members in 1968 with involvement by Bank of Jamaica, trading began in February 1969, 34 companies listed 1969 (website); 38 companies listed 1980 (IFC).

Jordan: Shares traded informally as early as 1930s, official market created by government and trading began January 1978 with 66 companies listed (website); 57 listed 1978 (Park and van Agtmael, 1993).

Kazakhstan: Founded 1993, began trading treasury bills 1995, received securities license November 1996 (FEAS); 18 companies listed 1998 (IFC).

Kenya: Established 1954 (MBendi, website).

Korea: Trading began March 1956 with 12 issues (Economist, 1988, website); established jointly by banks, insurance and securities companies under government sponsorship (ASAC, 1988).

Kuwait: Informal trading since 1950s; legal framework and organized area inaugurated February 1972, established by series of ministerial resolutions; closed during Gulf War (website); 32 companies listed 1976 (Robbins and Stobaugh, 1976).

Kyrgyz Republic: Exchange established 1995 by professional securities market participants with assistance from USAID within Kyrgyz legal framework (Kyrgyz Development Gateway: <http://wbweb13.worldbank.org/kyrgyz/index.html>).

Latvia: previous exchange 1937–40, first trading July 1995, nearly all companies listed result of privatization process (website); 17 companies listed 1995 (IFC).

Lebanon: Stock exchange established 1920s, closed 1983, reopened January 1996 (SSB).

Lithuania: opened September 1993 with 19 companies listed (personal correspondence with Diana Sokolova, National Stock Exchange of Lithuania); founded by government as part of economic reform/privatization program (National Stock Exchange of Lithuania publication on website).

Macedonia: Founded 1995, trading commenced March 1996 (website); 2 companies traded 1996 (FEAS); 2 companies listed 1998 (IFC).

Malawi: Opened November 1996 with one company listed, operates under Capital Markets Development Act of 1990 (MBendi).

Malaysia: stockbrokers formed exchange with limited, regulated trading activities in 1930; closed through 1946. Stock exchange formally instituted March 1960 (joint with Singapore). (ASAC, 1988).

Mali: See BRVM.

Malta: 4 companies listed 1994 (IFC).

Mauritius: Initiated by government, stock exchange began trading in July 1989 with 5 listed companies (website).

Moldova: Founded 1994, first transactions June 1995, 11 companies traded 1995 (FEAS); 21 companies listed 1998 (IFC).

Mongolia: First phase (February 1992–April 1995) operated to distribute vouchers; regular stock exchange began 1995, privatization program closely connected to establishment and development of stock exchange (website); 461 companies listed 1995 (IFC); 478 companies traded 1995 (FEAS).

Mozambique: first stock exchange began operations in October 1999 (MBendi).

Namibia: Founded by private businesses and individuals, opened to trading in October 1992 (MBendi; M-Web Africa: <http://www.mbwebafrica.com>); previous closed by 1920, 3 local companies originally listed (website).

Nepal: Companies offered shares beginning in 1937, Securities Exchange Centre established 1976, converted to stock exchange where

trading began January 1994 (website); established by government with assistance from USAID and the Center for Institutional Reform and the Informal Sector (IRIS: <http://www.iris.umd.edu>); 72 companies listed 1994 (IFC).

Nicaragua: Government, banks and private companies met starting in 1990 to discuss forming stock market, trading began January 1994, only bonds traded (Nica News, March 1999).

Niger: See BRVM.

Nigeria: Established 1960; began trading 1961 with 19 securities listed (website). Government action to form stock exchange began in 1946; trading began in 1961 with 8 stocks and equities listed and 7 UK firms traded (Yohannes, 1999).

Oman: trading began May 1989; 50 companies listed on regular market by year-end 1990; privatization is a factor in stock market development (Stanley, 1995).

Pakistan: opened 1947 with 5 companies initially listed (website, Price, 1994).

Palestine: Incorporated early 1995, first trading session February 1997, 28 companies approved for share-holding “so far” (website).

Panama: operations began June 1990 (SSB); 13 companies listed 1992 (IFC); most transactions in government bonds (<http://www.lowtax.net>).

Paraguay: stock market began operations 1994 (Paraguay–American Chamber of Commerce); 3 companies listed 1993 (IFC).

Poland: created by government; 5 companies originally listed; previous exchange 1817–1939 (website). Trading began July 1991; privatization played a role: first new (i.e., not privatized) firm listed April 1993 (Stanley, 1995).

Qatar: Established by Emiri decree in 1995, officially opened May 1997, 22 companies listed (2001) (Qatar Economic Review, January 2001).

Romania: Opened to trading November 1995, government established as part of economic reform program, and stock market played critical role in mass privatization program (Canadian International Development Agency: <http://www.acdi-cida.gc.ca>); previous exchange 1882–beginning of Communism (SSB); 9 companies originally listed (website).

Russia: first exchanges established 1990, voucher program 1992–94 (SSB); 13 companies listed 1991 (IFC).

Saudi Arabia: Shares traded as early as 1985; market established 1985 (U.S. State Department); share trading overseen by Saudi Arabian Monetary Agency (website); 59 companies listed 1991 (IFC).

Senegal: See BRVM. One Senegalese firm listed on BRVM in first year of operation.

Singapore: Stock exchange (joint with Malaysia) formally instituted in 1960; joint stock exchange continued after secession in 1965 until May 1973. The first Singapore-only stock exchange opened in 1973. (ASAC, 1988).

Slovakia: Trading began April 1993; privatization played a role (Stanley, 1995); Initiated by Ministry of Finance, 11 shares originally listed (501 unlisted) (website).

Slovenia: First trading March 1990 in 11 securities, after federal legislation established legal basis for stock market in 1989 (website) previous 1924–41 (?); (website).

Sudan: Established by government; opened January 1995 with 24 companies listed (SUDANOW, February 1995; MBendi).

Suriname: Founded 1994 as private foundation, 11 companies listed 1998.

Swaziland: Established by private initiative (MBendi) and government initiative (website); started operating in June 1990 (website); 1 company listed 1991 (IFC).

Taiwan: established late 1961 with capital from government-operated and privately owned banks and enterprises; trading began February 1962; 18 companies listed in 1962 (Economist, 1988); government initiated Stock Market Research Task Force in 1959 (website).

Tanzania: Incorporated 1996, following Capital Markets and Securities Act of 1994, first day of trading April 1998 with only one company listed (MBendi, website).

Thailand: private stock exchange 1962–early 1970s; official, state-sanctioned exchange opened 1975 (website, ASAC, 1988) 14 quoted securities at opening in 1975 (SSB, Price, 1994).

Togo: See BRVM.

Trinidad and Tobago: government policy to formalize securities market led to opening of stock market in October 1981 (website); 29 companies listed 1981 (IFC).

Tunisia: established in 1969 (website, MBendi); 13 companies listed 1990 (IFC); privatized in 1995 (Washington Times, July 10 2000).

Uganda Licensed by Capital Markets Authority in 1997, only East African Development Bank bond listed at opening (MBendi, website).

Ukraine: Established by government in 1991, practical activity began January 1992, joint stock companies created in privatization process auctioned beginning in 1995 (website); 125 companies listed 1998 (IFC); 122 companies traded 1995 (FEAS).

United Arab Emirates: 44 companies listed 1998 (IFC).

Uzbekistan: 4 companies listed 1996 (IFC); established 1991, listing procedure introduced 1998 and first company listed, 169 companies traded 1995 (FEAS).

Venezuela: Legal framework dates to 1873, exchange founded 1947, began operations with 18 share issues and 6 government bonds (SSB).

Vietnam: Opened July 2000 with 4 companies listed (BBC World Business Archive, <http://www.bbc.co.uk>).

West Bank and Gaza: 27 companies listed 1997 (IFC).

Zambia: established in 1993 with assistance from World Bank/International Development Corporation, opened in February 1994, most listings triggered by privatization process (MBendi); 5 companies listed at opening (J. Orford, "Exchanges: African Exchanges Heat Up," Global Custodian, Winter 1994).

Common Sources:

MBendi: <http://www.mbendi.com>

SSB: *Salomon Smith Barney Guide to World Equity Markets 2000*

FEAS: Federation of Euro-Asian Stock Exchanges, *Yearbook*: <http://www.feas.org/yearbook/>

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