Stock prices are not open-ended: Stock trading seems to be*

Gunther CAPELLE-BLANCARD∂
Université Paris 1 *Panthéon-Sorbonne*
gunther.capelle-blancard@univ-paris1.fr

First draft: August 2014
Current draft: April 2015

Abstract: Using World Bank data for 44 developed countries over the 1989-2011 period, I find very few significant factors explaining the total value of shares traded over GDP, or market capitalization: this latter is positively correlated with the level of GDP per capita and stock-market volatility, but not related to any domestic financial-system characteristics or legal origin. Moreover, contrary to common beliefs, there is no significant correlation between securities transaction taxes and trading activity.

Keywords: Financial markets; Stock markets; Financial deepening; Securities transaction tax; Financial transaction tax; Tobin tax.

JEL Classification: G21, H25.

* This paper has benefited from the financial support of *The Paul Woolley Centre for the Study of Capital Market Dysfunctionality* and from the *LabEx Refi*. I thank Andrew Clark and Jézabel Couppey-Soubeyran for helpful comments.
∂ University Paris 1 *Panthéon-Sorbonne*. 106-112 Bd de l'hôpital, 75013 Paris, France. Phone: +33 1 44 07 82 60.

Stock prices are not open-ended: Stock trading seems to be

1. Introduction

The total value of stocks traded in the world in 2013was about $100 trillion, as compared to $5 trillion in 1992. In the US, the total value of stocks traded is three times larger than US GDP. In Europe, stock trading is of the same order as GDP, while it was between 10% and 20% of GDP in 1992. The growth of stock-market trading worldwide is a well-known stylized fact. However, little is known about the drivers of such growth.

What is the optimal level of stock trading? Unfortunately, theoretical models do not tell us what trading volume should be: this could range from zero (in rational-expectation models without noise) to infinity (when traders dynamically hedge in the absence of trading costs). Nevertheless, Odean (1999) suggested that investors trade too much, so that trading activity is too high. Moreover, in the aftermath of the financial crisis, a number of pieces of work have also called into question the positive relationship between financial depth and economic growth (e.g. Arcand, Berkes, and Panizza, 2012) and have produced evidence of a non-monotonic relationship between the size of the financial system and economic growth, suggesting that there could be "too much" finance.

The aim of this paper is to examine the drivers of stock trading. While stock trading is a major topic of debate, there is surprisingly a lack of empirical literature. Most work on stock-market development uses (very) high-frequency data, whereas historical and international trends are considered here. Panel data econometric tools are used to determine the factors that are correlated with the total value of shares traded over GDP, or market capitalization, for a large set of countries (44 in the final sample) over the 1988-2011 period. There are considerable variations in stock trading across countries which are not explained in the academic literature. Data on the total value of shares traded comes from the World Bank dataset, as well as a number of economic, legal and institutional variables. A variety of estimators are considered, including the Driscoll-Kraay nonparametric covariance matrix estimator, which produces heteroscedasticity-consistent standard errors that are also robust to spatial dependence, in order to take stock market contagion and interdependence into account.

I also test whether the presence of a securities transaction tax (STT) significantly affects trading volume in the long run. A number of contributions have empirically examined the impact of STT on stock markets. This work has overall concluded to a fall in stock trading, but with no robust impact on volatility (Capelle-Blancard, 2014). All of this work has focused on particular events (the introduction of a transaction tax, its removal, or a change in the tax rate) and compared different

proxies for market liquidity and volatility before and after the event. I adopt a different approach in this paper, and rely on historical and cross-country variations in stock-trading and taxation schemes. This approach is complementary to that used to date, in that it considers long-term trends, and not only short-term effects. To conduct this analysis, I construct an original database on the presence of STTs across the world since the late 1980s.

Despite the use of a large set of economic, legal and institutional variables, I barely find any that are significantly correlated with stock trading, which seems to grow exogenously over time. The total value of shares traded over GDP, or market capitalization, is positively correlated with the level of GDP per capita and stock market volatility, but not with any characteristics of the domestic financial system or legal origin. Moreover, contrary to common beliefs, there is no significant impact of STT on trading activity.

2. Data and method

The aim of this paper is to assess the empirical drivers of stock trading worldwide, with a particular emphasis on the impact of STT. The dependent variable is measured in turn by the total value of stocks traded over GDP and the turnover ratio. The main source of data is the World Bank (World Development Indicators). The potential determinants of stock trading can be classified into five categories: domestic financial systems' depth, access, efficiency, and stability, plus institutional and legal variables. Data from the Global Financial Development Database are used to pick up the first four characteristics, while institutional and legal variables come from the Financial Development and Structure dataset.

Given data availability, our analysis period is limited to 1988-2011. All data are annual. I only consider countries with a minimum stock market capitalization of US$2 billion. This leaves 44 countries which represented, in 2008, 86.5% of world GDP, 95.8% of world stock-market capitalization, and 98.9% of the world total value of stocks traded.

I use panel data econometric models with country fixed-effects. Two specifications are considered in turn, according to the dependent variable:

$$ST\_GDP_{j,t} = \beta' X_{j,t} + \delta STT_{j,t} + \alpha_j + u_{j,t} \quad \text{(Eq. 1)}$$

$$TR_{j,t} = \beta' X_{j,t} + \delta STT_{j,t} + \alpha_j + u_{j,t} \quad \text{(Eq. 2)}$$

where $ST\_GDP_{j,t}$ (total value of stocks traded over GDP in %) and $TR_{j,t}$ (turnover ratio) are the dependent variables for country j at time t, $X_{j,t}$ is a time-variant $1 \times k$ regressor matrix, $STT_{j,t}$ a

dummy variable for the country levying an STT at time t, α_j the unobserved time-invariant individual effect, and $u_{j,t}$ the error term.

Our aim is to examine a large set of variables that are likely to influence the intensity of stock trading. However, theoretical models do not provide us with much information about what these should be, and I adopt an extensive empirical approach for the regressor matrix $X_{j,t}$. Fortunately, the Global Financial Development Database (GFDD) provides a great deal of harmonized data on the structure of financial systems across the world. I start with the largest possible dataset after an initial selection to eliminate series with an inadequate time dimension. This produced 31 variables, which can be classified into six categories: financial depth, efficiency and bank market structure, financial openness, stability, economics, and legal origin. I also consider a dummy variable to take into account the existence of an STT. This latter information was compiled manually (Capelle-Blancard, 2014) based on Pollin et al. (2003) and Schulmeister et al. (2008).

The preliminary diagnostics confirmed the presence of heteroskedasticity, cross-sectional dependence (contemporaneous correlation), and first-order serial correlation. I thus consider four different regression models with alternative standard-error estimates (Hoechle, 2007): i) a simple fixed-effect regression; ii) a fixed-effect regression with heteroscedasticity-consistent (or "Huber-White") standard errors; iii) a fixed-effect regression with bootstrap inference; and iv) a fixed-effect regression with the cross-sectional dependence-consistent Driscoll-Kraay estimator. Our preferred estimates come from the last model, which provides a nonparametric covariance matrix estimator producing heteroscedasticity-consistent standard errors that are robust to very general forms of spatial and temporal dependence. Given substantial stock-market contagion and interdependence, I very likely have cross-sectional dependence.

3. Results

Table 1 compares the results from the different models with their varying standard-error estimates for the fixed-effects estimator. The dependent variable is the total value of stocks traded over GDP (%) in panel A and the turnover ratio in Panel B. I find only few variables that are significantly correlated with the level of stock trading. These results are similar across techniques and panels.

The proxies for financial depth, banking-market efficiency and financial openness, are insignificant. However, the (in)stability indicators – the banking crisis dummy and stock market volatility – are both correlated with stock trading: in times of banking crisis, stock trading is lower, while it rises with stock-market volatility. Overall, the growth of stock trading only seems to be affected by

cyclical factors. These results are then consistent with the self-development of stock trading, with autonomous growth that is independent of economic fundamentals.

Last, the STT dummy variable is never significant, whatever the model or specification. This is somewhat surprising as a number of pieces of work have empirically demonstrated a negative correlation between STT and stocks traded. To reconcile these results, one should bear in mind that most of the main international financial centers (Hong Kong, Switzerland, UK, etc.) actually levy a STT. This STT may affect stocks traded in the short run in a given country, but this does not mean that there is a significant long-run effect.

I have tested a number of other combinations of variables and proxies without changing our conclusion (results available on request). I have also estimated the model in first-differences. The picture is very similar with almost no significant explanatory variables. Interestingly, the variable in level is significant and positive, again suggesting autonomous growth.

4. Conclusion

A large (and sound) financial system is undoubtedly essential for development and growth… as long as it remains within some limits. There is a large body of literature on stock-market development and efficiency but, surprisingly, almost no theoretical or empirical work on the growth of stock trading.

Using World Bank data for 44 developed countries over the 1989-2011 period, and taking into account cross-sectional dependence, I find very few significant factors that explain the total value of shares traded over GDP or market capitalization: this is positively correlated with the level of GDP per capita and stock-market volatility, but unrelated to any characteristics of the domestic financial system, origin or the existence of an STT.

References

Arcand, J.L., E. Berkes, and U. Panizza, 2012, Too Much Finance? IMF Working Paper 12/161.

Capelle-Blancard, G., 2014, Financial Transaction Tax: Recent Evidence, Université de Paris 1, mimeo.

Hoechle, D., 2007, Robust standard errors for panel regressions with cross–sectional dependence, Stata Journal, 7 (3).

Odean, T., 1999, Do Investors Trade Too Much? American Economic Review, 89(5): 1279-1298.

Pollin, R., D. Baker and M. Schaberg, 2003, Securities Transaction Taxes for U.S. Financial Markets, Eastern Economic Journal, 29(4), 527-558.

Schulmeister, S., M. Schratzenstaller, and O. Picek, 2003, A General Financial Transaction Tax: Motives, Revenues, Feasibility and Effects, Monograph No 3, Wien: WIFO.

Table 1. The empirical determinants of stock trading

This table shows the estimated coefficients from the regression models in (Eq. 1) and (Eq. 2) estimated by fixed effects (within) regression. The standard errors (in parentheses) are obtained from the covariance matrix estimators in the column headings. The dataset contains annual observations from 1988 to 2011 on a panel of 44 countries with market capitalization over US$2 billion. The dependent variable in the regression is the total value of stocks traded over GDP (%) in panel A and the turnover ratio (defined as the ratio of annual traded value to year-end market capitalization) in Panel B. The data come from the World Bank (WDI and GFDD).

Panel A *Stocks traded over GDP (%)*	(1) Fixed-effects	(2) Robust	(3) Bootstrap	(4) Driscoll-Kraay
Year	0.8997	0.8997	0.8997	0.8997
	(1.0928)	(2.1024)	(2.9835)	(1.4923)
Credit/GDP	0.2504	0.2504	0.2504	0.2504
	(0.1834)	(0.3173)	(0.3690)	(0.2855)
No. listed firms / Pop.	1.1874***	1.1874	1.1874	1.1874*
	(0.1683)	(0.8544)	(0.9396)	(0.5900)
Foreign claim/GDP	0.0136	0.0136	0.0136	0.0136
	(0.1279)	(0.1512)	(0.1705)	(0.2188)
Bank Spread	0.3148	0.3148	0.3148	0.3148
	(1.2977)	(0.9254)	(1.5016)	(0.7745)
Bank crisis (dummy)	–18.0693*	–18.0693*	–18.0693*	–18.0693**
	(10.2515)	(10.0706)	(10.6715)	(8.1880)
Credit/deposits	–0.2877**	–0.2877	–0.2877	–0.2877
	(0.1372)	(0.2000)	(0.3078)	(0.1987)
Stock Market Volatility	0.9881***	0.9881*	0.9881*	0.9881**
	(0.3311)	(0.5654)	(0.5335)	(0.4541)
STT (dummy)	–9.5966	–9.5966	–9.5966	–9.5966
	(13.5374)	(19.2213)	(34.1022)	(17.1575)
GDP (ln)	2.6025	2.6025	2.6025	2.6025
	(12.6630)	(20.0307)	(28.4855)	(12.0581)
GDP (ln) * legal origin UK	–15.2033	–15.2033	–15.2033	–15.2033
	(12.4844)	(13.5282)	(18.0795)	(9.7834)
GDP/cap.	0.0070***	0.0070	0.0070	0.0070**
	(0.0014)	(0.0048)	(0.0046)	(0.0028)
Constant	–1.84e+03	–1.84e+03	–1.84e+03	–1.84e+03
	(1946.6417)	(3854.1367)	(5424.5841)	(2767.8931)
N	477	477	477	477
Adj. R^2	0.232	0.293	0.232	

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 1. The empirical determinants of stock trading (continued)

This table shows the estimated coefficients from the regression models in (Eq. 1) and (Eq. 2) estimated by fixed effects (within) regression. The standard errors (in parentheses) are obtained from the covariance matrix estimators in the column headings. The dataset contains annual observations from 1988 to 2011 on a panel of 44 countries with market capitalization over US$2 billion. The dependent variable in the regression is the total value of stocks traded over GDP (%) in panel A and the turnover ratio (defined as the ratio of annual traded value to year-end market capitalization) in Panel B. The data come from the World Bank (WDI and GFDD).

Panel B *Turnover ratio (%)*	(1) Fixed-effects	(2) Robust	(3) Bootstrap	(4) Driscoll-Kraay
Year	0.6290	0.6290	0.6290	0.6290
	(0.7366)	(0.9432)	(1.1712)	(0.9160)
Credit/GDP	0.0680	0.0680	0.0680	0.0680
	(0.1227)	(0.1718)	(0.2108)	(0.1412)
No. listed firms / Pop.	0.1414	0.1414	0.1414	0.1414
	(0.1122)	(0.1342)	(0.1957)	(0.1268)
Foreign claim/GDP	0.0195	0.0195	0.0195	0.0195
	(0.0853)	(0.0754)	(0.0806)	(0.0849)
Bank Spread	0.1099	0.1099	0.1099	0.1099
	(0.8700)	(0.5912)	(0.7269)	(0.6857)
Bank crisis (dummy)	–16.0990**	–16.0990**	–16.0990**	–16.0990***
	(6.8125)	(6.5890)	(6.8466)	(4.3606)
Credit/deposits	0.0014	0.0014	0.0014	0.0014
	(0.0917)	(0.1451)	(0.1748)	(0.1080)
Stock Market Volatility	1.1997***	1.1997**	1.1997***	1.1997***
	(0.2282)	(0.5098)	(0.4211)	(0.2321)
STT (dummy)	–4.9811	–4.9811	–4.9811	–4.9811
	(9.0595)	(10.8810)	(11.7292)	(5.2723)
GDP (ln)	1.6990	1.6990	1.6990	1.6990
	(8.4374)	(8.5582)	(10.3483)	(8.7077)
GDP (ln) * legal origin UK	–13.3044	–13.3044	–13.3044	–13.3044
	(8.6119)	(13.5985)	(11.8058)	(8.3679)
GDP/cap.	0.0027***	0.0027	0.0027	0.0027**
	(0.0010)	(0.0021)	(0.0027)	(0.0013)
Constant	–1.19e+03	–1.19e+03	–1.19e+03	–1.19e+03
	(1314.8999)	(1732.6464)	(2194.0001)	(1672.8208)
N	471	471	471	471
Adj. R^2	0.033	0.111	0.033	

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$