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E-mail addresses: Franz.Hahn@wifo.ac.at
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FRANZ R. HAHN

Austrian Institute of Economic Research

P.O. Box 91

A-1103 Vienna

Franz.Hahn@wifo.ac.at

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Abstract

This paper is making an attempt to examine the nature of the linkage between financial development and economic fluctuation. In so doing, we sort out the main arguments supporting both the view that the expansion of financial markets tends to create risks which are not easily insured and that relationship-based financial systems may provide a protective shield against those macroeconomic shocks. We next ask whether the available data support a role for stock market activities in the amplification of output growth fluctuation for the set of OECD countries, and whether bank intermediation promotes shock mitigation by facilitating intertemporal risk smoothing. We do this by applying the cross-sectional instrument-variable estimator and the static fixed effects panel estimator, respectively to a balanced panel of data for 22 OECD countries covering the period from 1970 to 2000. The evidence obtained confirms the claim that arm's length financial systems do have a role in destabilizing the underlying long-term output growth pattern in OECD countries. What matters here is market size. The magnitude of the independent impact on underlying growth fluctuation is economically significant. Bank-based financial systems instead exert a mitigating influence on the business cycle but fail to shield the economy against shocks which reach beyond the cycle.

JEL classification: E22, G00, G30, O16, O40

Keywords: growth, fluctuation, financial system, stock market, panel analysis.

1. Introduction

Empirical evidence is piling up supporting the view that stock markets do matter as an overall growth factor. Only recently has an OECD study provided new empirical evidence suggesting that since the 1970s stock market development have promoted economic growth in high income countries (see *Leahy et al.*, 2001). These findings have been questioned by *Hahn* (2002A) on the ground that, in these studies, financial development indicators are used which are highly biased by price effects. *Hahn* (2002A) shows that when price effects are appropriately controlled for the positive linkage between stock market development and economic growth in high income countries is no longer statistically significant.

Unfortunately, the finance-growth nexus dominates so much the respective research agenda that little incentive is out for writers to explore, in depth, other topics closely related to the "finance-matters-discussion". One of these so far neglected topics is how financial development is related to managing macroeconomic risk. There is a widely held presumption that economies with highly developed financial markets are superior to bank-dominated economies in allocating resources and in sharing risks, respectively. Yet, in following the wording of *Allen – Gale* (2000), there is also a sense in which economies with fewer choices of financial instruments can offer superior sharing of macroeconomic (or nondiversifiable) risks. *Allen – Gale* (2000) point to countries, most preferably to Japan, Germany and France, in which a large amount of wealth is held in the form of bank deposits shielding quite successfully private households from fluctuations in the value of assets that are marked to market. Private households in countries with arm's length financial systems such as the United States' and United Kingdom's, though, are said to have been far more exposed to macroeconomic shocks in the recent past than Germany's or France's private households. Compelling examples in favor of this point are the highly inconvenient repercussions of the two major oil shocks in the 1970s and early 1980s, respectively, giving many US households with marked-to-market wealth a truly hard time to get back on track again.

Thus the aim of this paper is to explore these very topics just outlined more carefully by exposing plain presumptions to (more or less) plain data. The rest of the paper is structured as follows. In Section 2, we sort out the main arguments supporting both the view that the expansion of financial markets tends to create risks which are not easily insured and that relationship-based financial systems may provide a protective shield against those macroeconomic shocks. We next ask whether the available data support a role for stock market activities in the amplification of output growth fluctuation for the set of OECD countries, and whether bank intermediation promotes shock mitigation by facilitating intertemporal risk smoothing. We do this in Section 3 using the cross-sectional instrument-variable estimator and the static fixed effects panel estimator, respectively. Section 4 presents the results. Section 5 concludes.

2. Competition versus Insurance

A widely held presumption is that markets tend to accentuate the difference between the incompetent, the unskilled, or the untalented and the more qualified, thus exacerbating the need for insurance (*Rajan – Zingales*, 1999A). Competitive markets are often accused of lightly

destroying old relationship-based structures of insurance while not providing enough protection against risks which come naturally with a more advanced competitive outside environment. In general, risks created by the expansion of markets are assumed to be hard to diversify away. For example, since the early 1970s free trade and open capital accounts have pushed market development across the globe thereby putting, even in highly developed countries, enormous stress on various industries by incurring adjustment costs well above the level the disenchanted have been willing to bear. As a reaction, protectionist tendencies have been, for quite some time, on the rise again in many countries, already reaching a magnitude which, at least for politicians in western-style democracies, is getting increasingly harder to resist.

What is widely undisputed, however, is that market-based financial systems are better than relationship-based financial systems at supplying investors with state-of-the-art opportunities for diversifying idiosyncratic risks. Moreover, markets-driven systems are also said to have the greater allocative efficiency power than the intermediation-driven systems. In good times, the advantages of developed financial markets, by making everybody better off, outweigh by far the disadvantages associated with markets such as the lack of insurance which, of course, is not taken as a loss in the time of plenty. In bad times, however, even almost perfectly hedged positions all too often turn out to be not much of a cover since counterpart risks tend to be, to a large extent, highly positively correlated with macroeconomic shocks. This breeds systemic risks which, in overly market-oriented economies, are assumed to be particularly hard to cope with without appropriate government assistance. Thus, as put in *Rajan – Zingales* (1999A), competition when coupled with the lack of commitment that leads to incomplete contracting and free-riding makes it hard for markets to provide the necessary cross-subsidies that mitigate its harshness. In order to provide insurance in countries with market-oriented financial systems the respective governments are often called upon to play an active role, or at least convey to the electorate their firm determination to intervene in the working of markets whenever shocks occur triggering trouble too big for a markets system to settle on its own.

Departing from the traditional approach, *Allen – Gale* (2000) explore another strategy suitable to hedge for nondiversifiable risks. They argue that, where incomplete markets do not provide for effective intertemporal smoothing, long-lived financial institutions such as banks can do so. Intermediaries are said to be capable of providing insurance ex post by making transfers that act as a substitute for missing markets. However, banks can only supply this service as long they are not subject to competition from financial markets. The point is that "in good times individuals would rather opt out of the banking system and invest in the market, so in the long run, intertemporal smoothing by banks is not viable in the presence of competition from markets." (*Allen – Gale*, 2000, p.156)

In sum, however, the message from the existing research is overwhelmingly that financial development proceeds along the lines of more arm's length financing at the expense of relationship lending (and insurance), of stiffer competition at the expense of crony capitalism, and of higher standards of disclosure and accountability at the expense of business opaqueness. However, the latest development in the US accounting and disclosure drama in 2001 and 2002 has not only sent the world's stock markets into one of the worst rollercoaster rides ever but also shed a new and somewhat twisty light on the claim that arm's length financing is superior to relationship

lending. The recent US corporate scandal may well be good enough a trigger to make the research community take, once more, a new, and fresh look at financial development and its macroeconomic role. It would not come as a surprise if as new consensus emerged that arm's length financing is at least as much relationship-based as good, old bank lending.

3. Data and Methodology

3.1 The Data

We build a balanced panel data set for 22 OECD over the period 1970 through 2000. Data are averaged over non-overlapping ten-year intervals. Details as to the OECD countries covered, the variables defined and the data sources referred are given in the Data Appendix. To allow for an examination of the importance of the frequency of the data used, we also average over five-year periods between 1971 and 2000.

We identify CAPITALIZATION defined as value of listed shares on domestic exchanges divided by GDP, VALUE TRADED defined as the value of the trades of domestic shares on domestic exchanges divided by GDP, and TURNOVER defined as VALUE TRADED divided by CAPITALIZATION as indicators for the strength of arm's length financing and, according to the line of reasoning in the preceding section, as indicators for the level of overall financial development. CAPITALIZATION measures the size of the stock market while VALUE TRADED and TURNOVER are supposed to capture the liquidity and the efficiency level of the stock markets, respectively. CREDIT equals the value of credits by financial intermediaries to the private sector divided by GDP and is our preferred indicator for the strength of relationship lending. According to *Levine et al.* (2000), CREDIT is a reasonably accurate measure of a country's level and sophistication of financial intermediation and fairly unbiased by the relative importance of state-owned enterprises and the overall level of nationalization.

As a measure of output growth fluctuation, the dependent variable in our regression approach, we use alternately the standard deviation of annual potential output growth (PO_SD), the standard deviation of annual real GDP growth (GDP_SD), the standard deviation of the output gap (CY_SD), the difference between the maximum and the minimum annual potential output growth (PO_DIFF), the difference between the maximum and the minimum annual GDP growth (GDP_DIFF), and the difference between the maximum and the minimum of the output gap (CY_DIFF). Each fluctuation measure is calculated over the same range of time as the regressors are averaged (i. e., five or ten-year period). While these very indicators are highly imperfect measures they cover a rather broad range of manifestations of macro-shocks with PO_SD (and PO_DIFF) capturing shocks which are strong enough to make long-term growth potential fluctuate on the one end of the spectrum, and with CY_SD (and CY_DIFF) portraying most likely short-lived shocks which are mainly associated with the business cycle on the other.

The set of variables that serves as conditioning information consists of OPENNESS, equaling exports plus imports of goods divided by GDP, and GOVERNMENT as measured by government consumption expenditure divided by GDP. OPENNESS stands for the "outward orientation" of an

economy and thus for the degree to which a country may be exposed to external shocks. GOVERNMENT instead provides a convenient summary of the strength of the internally stabilizing economic conditions in a given country.

Table B in Data Appendix gives an overview of summary statistics and correlations, respectively.

3.2   Methodology

Methodologically, we use two econometric techniques: (a) a cross-sectional instrument-variable estimator (IV) and (b) the static fixed effects panel estimator (SFE). The former estimator controls, in the given context, for simultaneity with the initial values of the complete set of regressors as instruments and deals, in a static environment, with the potential problems caused by omitted variables and unobserved country-specific effects nearly as rigorously as the GMM estimators in dynamic panel data modeling. The latter estimator is designed to capture variation across countries and time periods in simple shifts of the regression function (i. e. changes in the intercepts).

The basic regression equation estimated by both techniques takes the following form:

$$FLUCTUATION_{i,t} = \alpha + \beta\,FINANCE_{i,t} + \gamma\,[CONDITIONING\;SET]_{i,t} + \lambda_t + \eta_i + \varepsilon_{i,t}$$

with time periods $t = 1,....,T$; and countries $i = 1,....,N$. The λ_t and η_i are respectively time- and country-specific effects, and $\varepsilon_{i,t}$ is the remainder stochastic disturbance term. The dependent variable FLUCTUATION equals either PO_SD, PO_DIFF, GDP_SD, GDP_DIFF, CY_SD, or CY_DIFF, the regressor FINANCE equals either CAPITALIZATION, VALUE TRADED, TURNOVER, or CREDIT and CONDITIONING SET consists of OPENNESS and GOVERNMENT. The latter variables are included to control for the prime non-financial external and internal factors closely associated with the magnitude of output growth fluctuations at the macroeconomic level.

4.   Results and Discussion

The static fixed effects model is supported by the Hausman test procedure that tests the null hypothesis of the random effects model against the alternative hypothesis of the fixed effects model. The Hausman test statistics reject the null at the 5 percent significance level in all models estimated. Testing for fixed effects shows that the null $H_0 : \lambda_t = 0, \; \eta_i = 0,$ for $t = 1, 2,$ and $i = 1,....,21$ is rejected at the level of 5 percent in all estimated models. Beyond that, the fixed effects model is widely assumed to be an appropriate specification when the focus of inference is restricted to the behavior of a specific set of N groups such as the set of OECD countries.

The results in Table 1 show that both IV and SFE estimates suggest that arm's length financing is positively related to macroeconomic risks as measured by the fluctuation of the long-term growth potential and relationship lending is negatively correlated with cycle-based output variation. The

Table 1: Output Fluctuation Regressions for OECD countries
1971 through 2000, ten-year averages

Dependent Variables	IV[1]			SFE		
	PO_SD	GDP_SD	CY_SD	PO_SD	GDP_SD	CY_SD
Regressors						
Constant	0.0009	0.0504	0.0246	0.0009	0.0579	0.0349
	(0.788)	(0.002)	(0.114)	(0.676)	(0.000)	(0.012)
CAPITALIZATION	0.0060			0.0049		
	(0.055)			(0.011)		
CREDIT		-0.0123	-0.0119		-0.0161	-0.0125
		(0.096)	(0.105)		(0.013)	(0.049)
OPENNESS	0.0078			0.0117		
	(0.658)			(0.120)		
GOVERNMENT		-0.1261	0.0268		-0.1562	-0.0334
		(0.170)	(0.767)		(0.042)	(0.653)
R^2				0.488	0.599	0.502
Number of observations	66	66	66	66	66	66
OECD Countries	22	22	22	22	22	22
			p-values			
Wald test for joint significance				0.008	0.002	0.103
Wald test for joint group dummy				0.000	0.000	0.000
Wald test for time dummy significance				0.004		
Sargan test[2]	0.401	0.327	0.067			

The regressions also include dummy variables for the different time periods and countries that are not reported; p-values in parentheses. – 1) Instruments include the full set of regressors and the initial values of the ratio of gross fixed investment to output, GOVERNMENT, OPENNESS, CAPITALIZATION and CREDIT. – 2) The null hypothesis is that the instruments used are not correlated with the residuals.

estimates also indicate that the independent relation between financial development and output fluctuation is economically significant.

For brevity, we report only the results on those financial indicators which enter with a p-value below 0.10. Given this significance benchmark, both "size indicators", CAPITALIZATION and CREDIT, are significant in almost all IV and SFE regressions while the coefficients on the liquidity and efficiency indicators, TURNOVER and VALUE TRADED, turn out to be insignificant in most cases (the latter coefficients therefore remain unreported). As to the linkage between financial development and output fluctuation, market size obviously matters, market liquidity and market efficiency don't.

An interesting feature of the regressions analysis is that large stock markets are stronger related to potential output growth fluctuation than to GDP growth or output-gap variation. OPENNESS works into the same direction, but does so mostly statistically insignificant. These results are consistent with the view that countries with an arm's length financial system are more prone to getting "fundamentally" destabilized than countries with a bank-dominated financial system. Further, the results also indicate a mitigating impact of relationship lending and government size on the business cycle as measured by CY_SD (CY_DIFF) and GDP_SD (GDP_DIFF), respectively. Note that CREDIT and GOVERNMENT do not enter significantly in the regressions with the trend-based fluctuation measures such as PO_SD (PO_DIFF) as the dependent variable. These findings can be read, one, as pieces of evidence in favor of the notion that bank-based financial systems (and countries with large governments) are more capable of dampening the business cycle than market-based systems, and, two, as an empirical hint against the presumption that bank-based systems significantly weaken those macroeconomic risks which are capable of destabilizing the long-term growth potential.

The R^2 from the regressions suggest that a large portion of the cross-sectional output growth fluctuation can be explained by our simple models.

When using data averaged over five-year periods these findings hold only with respect to cycle-based variation measures (Table 2). However, as to the data averaged over ten-year-periods the presented findings survive various robustness tests as reported in Table 3. More details on these sensitivity results are available on request.

5. Conclusion

This paper made an attempt to examine the nature of the linkage between financial development and economic fluctuation. We used two econometric techniques. The first, cross-sectional instrument-variable estimators deal, to some degree, with the potential problems caused by simultaneity, omitted variables and unobserved country-specific effects. As a consistency check, we also used the fixed effects panel estimator. The latter is designed to capture variation across countries and time periods in simple shifts of the regression function (i. e. changes in the intercepts). The results confirm the claim that arm's length financial systems have a role in destabilizing the underlying long-term output growth pattern in OECD countries. What matters is market size. The magnitude of the independent impact on underlying growth fluctuation is

Table 2: Output Fluctuation Regressions for OECD countries
1971 through 2000, five-year averages

Dependent Variables	IV[1]		SFE	
	CY_SD	CY_DIFF	CY_SD	CY_DIFF
Regressors				
Constant	0.0371	0.1000	0.0455	0.1027
	(0.006)	(0.000)	(0.000)	(0.000)
CREDIT	-0.0123	-0.0314	-0.0185	-0.0401
	(0.078)	(0.005)	(0.003)	(0.010)
GOVERNMENT	-0.0587	-0.2437	-0.0956	-0.1845
	(0.426)	(0.064)	(0.125)	(0.236)
R^2			0.452	0.442
Number of observations	66	66	66	66
OECD Countries	22	22	22	22
	p-values			
Wald test for joint significance			0.009	0.030
Wald test for joint group dummy significance			0.000	0.000
Wald test for time dummy significance			0.067	0.037
Sargan test[2]	0.271	0.850		

The regressions also include dummy variables for the different time periods and countries that are not reported; p-values in parentheses. – 1) Instruments include the full set of regressors and the initial values of the ratio of gross fixed investment to output, GOVERNMENT, OPENNESS, CAPITALIZATION and CREDIT. – 2) The null hypothesis is that the instruments used are not correlated with the residuals.

Table 3: Sensitivity Analysis of Output Fluctuation Regressions
1971 through 2000, ten-year averages

	IV[1]			SFE		
Dependent Variables	PO_DIFF	GDP_DIFF	CY_DIFF	PO_DIFF	GDP_DIFF	CY_DIFF
Regressors						
Constant	0.0018	0.1797	0.0945	0.0028	0.1973	0.1320
	(0.846)	(0.001)	(0.040)	(0.642)	(0.000)	(0.001)
CAPITALIZATION	0.0161			0.0134		
	(0.062)			(0.013)		
CREDIT		-0.0451	-0.0386		-0.0528	-0.0449
		(0.055)	(0.073)		(0.011)	(0.017)
OPENNESS	0.0262			0.0265		
	(0.594)			(0.202)		
GOVERNMENT		-0.4942	-0.0161		-0.5701	-0.2192
		(0.092)	(0.952)		(0.020)	(0.315)
R^2				0.482	0.599	0.509
Number of observations	66	66	66	66	66	66
OECD Countries	22	22	22	22	22	22
			p-values			
Wald test for joint significance				0.013	0.001	0.020
Wald test for joint group dummy significance				0.000	0.000	0.000
Wald test for time dummy				0.013		
Sargan test[2]	0.564	0.207	0.213			

The regressions also include dummy variables for the different time periods and countries that are not reported; p-values in parentheses. – 1) Instruments include the full set of regressors and the initial values of the ratio of gross fixed investment to output, GOVERNMENT, OPENNESS, CAPITALIZATION and CREDIT. – 2) The null hypothesis is that the instruments used are not correlated with the residuals.

economically significant. Bank-based financial systems instead exert a mitigating influence on the business cycle but fail to shield the economy against shocks which reach beyond the cycle.

It goes without saying that the presented results are highly preliminary. Much more investigation, theoretically and empirically, is needed before we can be confident that there is a positive relationship between financial markets and macroeconomic risks with the causality running from the former to the latter. This paper may be taken as a first step into this still widely unexplored territory.

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Data Appendix

Table A: Variables and Sources

Variable	Definition	Original source	Second source
GDP	Real gross domestic product, purchasing power parities	OECD Economic Outlook	
PO	Potential output, purchasing power parities	OECD Economic Outlook	
CY	Output gap	OECD Economic Outlook	
GOVERNMENT	Government consumption divided by gross domestic product	OECD National Accounts (gross domestic product: WIFO database)	
OPENNESS	Exports of goods plus imports of goods divided by gross domestic product	IFS (gross domestic product: WIFO database)	
CREDIT	Claims on private sector divided by gross domestic product	IFS (lines 22d + 42d)	
CAPITALIZATION	Market capitalization of domestic shares divided by gross domestic product	FIBV (gross domestic product: WIFO database)	Own calculations for 1970 through 1973
VALUE TRADED	Values of domestic share trading divided by gross domestic product	FIBV (gross domestic product: WIFO database)	Own calculations for 1970 through 1983
TURNOVER	VALUE TRADED divided by CAPITALIZATION		
GDP_SD	Standard deviation of annual real gross domestic product growth		
PO_SD	Standard deviation of annual potential output growth		
CY_SD	Standard deviation of output gap		
GDP_DIFF	Difference between minimum and maximum annual real gross domestic product		
PO_DIFF	Difference between minimum and maximum annual potential output growth		
CY_DIFF	Difference between minimum and maximum output gap		
Countries	Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Turkey, United Kingdom, USA.		

Table B: Summary Statistics
1971 through 2000

	GDP_SD	PO_SD	GOVERN-MENT	OPEN-NESS	CAPITALI-ZATION	VALUE TRADED	CREDIT	TURN-OVER	CY_SD	CY_DIFF	PO_DIFF	GDP_DIFF
Descriptive statistics												
Means	0.0225	0.0056	0.1871	0.5066	0.3910	0.1444	0.6929	0.3152	0.0230	0.0696	0.0161	0.0713
Standard deviation	0.0103	0.0034	0.0454	0.2886	0.4271	0.1702	0.3090	0.2573	0.0091	0.0269	0.0095	0.0327
Correlations												
GDP_SD	1.0000	0.4101	-0.4079	0.0370	-0.0163	-0.2081	-0.3988	-0.1407	0.7235	0.7860	0.3832	0.9640
PO_SD		1.0000	-0.3986	0.0657	0.1018	-0.1161	0.0194	-0.0846	0.2035	0.2646	0.9830	0.4248
GOVERNMENT			1.0000	0.3703	0.0700	0.0754	-0.0163	-0.0450	-0.2427	-0.2727	-0.4097	-0.4314
OPENNESS				1.0000	0.3239	-0.1392	0.0578	-0.2285	-0.0252	-0.0016	0.0348	0.0216
CAPITALIZATION					1.0000	0.4833	0.4857	0.0826	-0.1643	-0.1378	0.0949	-0.0519
VALUE TRADED						1.0000	0.4625	0.6895	-0.2116	-0.2231	-0.0806	-0.2214
CREDIT							1.0000	0.2308	-0.3161	-0.3193	0.0379	-0.3695
TURNOVER								1.0000	-0.1342	-0.1494	-0.0570	-0.1771
CY_SD									1.0000	0.9684	0.1587	0.7261
CY_DIFF										1.0000	0.2156	0.7866
PO_DIFF											1.0000	0.3997
GDP_DIFF												1.0000