Short Selling Bans and Market Liquidity around the World: Evidence from the 2007-09 Crisis

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Short Abstract

Most stock exchange regulators around the world have reacted to the financial crisis of 2007-2009 by imposing bans or regulatory constraints on short-selling by market participants. We use the large amount of evidence generated by the introduction and lifting of these bans to investigate the effects of short-selling bans on liquidity and price discovery. The enactment and lifting of bans at different dates in different countries, in some countries for financial stocks only, and often with different degrees of stringency, enables us to use panel data techniques to investigate their effects. We also investigate the cross-sectional effect of bans on liquidity of stocks with different market capitalization and different volatility. Finally, we analyze the effect of bans on other measures of market quality, such as price discovery and the skewness of stock returns.

Short-selling is an integral part of the trading strategies of institutional investors, in particular hedge funds. Our research has the potential to show to regulators that banning short selling has detrimental effects on market quality and, as a result, it is not an appropriate policy action.

1. Research objectives

Most stock exchange regulators around the world have reacted to the financial crisis of 2007-2009 by imposing bans or regulatory constraints on short-selling by market participants. These hurried interventions, which in many countries have been selective and have varied considerably in intensity and duration, have been presented as measures to restore the orderly functioning of securities markets and limit unwarranted drops in securities prices.

However, theoretical reasons and previous evidence cast doubt on the benefits of short selling bans, in particular for the liquidity and the price discovery function of securities markets. Since the crisis has been accompanied by a steep increase in bid-ask spreads in stock markets, it is important to understand whether and to what extent the short selling bans have contributed to their increase. If it were true that, far from restoring “orderly market conditions” as claimed by policy makers, these interventions actually reduced market liquidity, this would be a serious indictment of their adoption, especially considering that they were enacted at a time when market participants desperately sought liquidity on stock markets, due to the freeze of the structured debt and interbank markets.

In this paper we bring the large amount of evidence generated by the crisis to bear on this issue: this flurry of short selling bans has generated a wealth of data to investigate the effects of short-selling bans on liquidity, price volatility and price discovery. The fact that the bans were imposed and lifted at different dates in different countries, and in many countries for different sets of stocks (only financials in some countries, all stocks in others) and with different degrees of stringency, allows the use of panel data techniques to investigate the effects of the ban – in particular, the inclusion of fixed stock-level effects to control for stock characteristics and of calendar dummies to control for worldwide changes in volatility and liquidity. This approach also allows investigating whether liquidity has been affected differentially in the cross-section of stocks, for instance large- versus small-cap stocks, or stocks with low volatility versus stocks with large volatility.

While the primary focus of our study is on market liquidity, we also investigate the effects of short selling bans on other dimensions of market performance that have been considered in the literature, such as price discovery and return skewness.

2. Literature review

Most work on short-selling bans has considered their effects on four variables: market liquidity, price discovery, volatility, and overvaluation of stocks, with the latter taking the lion's share. In the present study we focus mainly on their effects on liquidity, but will also address the others to some extent. As a starting point, we consider which effects are predicted by the theory for each variable, and give a brief account of the evidence so far.

2.1 Liquidity

The effects of short selling bans on liquidity are in principle ambiguous. Diamond and Verrecchia (1987) analyze their effects in a variant of the Glosten and Milgrom (1985) model and show that, by preventing informed investors to trade on bad news, short selling bans reducing the speed of price discovery. By delaying the resolution of uncertainty about fundamentals, the ban tends to increase the bid-ask spread.

However, this result applies only if the ban constrains equally informed and uninformed investors. If instead all potential short-sellers are informed traders (consistently with intuition and with much evidence), a short-selling ban will reduce the fraction of informed traders in the pool of 'sell-or-short' transactions, making each remaining trade at the bid less informative. On this account the ban would tend to reduce the bid-ask spread, for a given amount of information revealed by past trades. But since the ban also slows the revelation of such information, the overall effect on bid-ask spread is ambiguous.

The effect of short-selling bans on liquidity has not been examined in models of dealers with inventory holding costs. However, intuition suggests that in such models a short-selling ban should increase the bid-ask spread, by making it more difficult for market makers to provide liquidity on the bid side: when unable to short the stock, offering to sell the same amount of a stock requires a larger inventory, and therefore more risk-taking (especially at times of high volatility such as the current crisis). And even if market makers manage to retain access to short selling, the ban will limit the competition by other liquidity suppliers and therefore should allow them to widen their spreads on this account. So in an inventory holding cost model the implications of a short-selling ban for the quoted spread and/or market depth appear more clear-cut than in the adverse selection setting by Glosten and Milgrom.

The limited evidence available so far is on the whole consistent with the idea that short-selling bans damage liquidity, though not unambiguously. The piece of evidence most directly related to the present study is the recent paper by Boehmer, Jones and Zhang (2008), who analyze with panel data techniques the response of measures of liquidity to the short-selling ban imposed from September 18 to October 8 in the United

States, exploiting the difference between the (financial sector) stocks targeted by the ban and those that were not. They find that liquidity – as measured by spreads and price impacts – deteriorated significantly for stocks subject to the ban. The study by Jones and Lamont (2002) on the Great Depression investigates the change in liquidity around events that alter the level of short-sale constraints in the U.S. stock markets, and finds that the introduction of the requirement that brokers secure written authorization before lending a customer's shares in 1932 had a negative impact on liquidity, but the requirement that short selling be executed only on an up tick in 1938 had a positive effect on liquidity. Charoenrook and Daouk (2005), who investigate the effects of market-wide short-sale restrictions on a number of variables for 111 countries, find that short-sale restrictions correlate with greater market-wide liquidity, as measured by total stock market trading volume. However, trading volume is well-known to be a poor proxy for market liquidity.

Our contribution differs from Boehmer et al. (2008) because it analyzes how liquidity reacted to the recent short selling bans in 30 countries, as opposed to the United States alone. This is important, because these bans were enacted and lifted at different times in different countries, often had different stringency, and in some countries were not imposed at all. Moreover, in some countries bans applied only to financial stocks as in the U.S., while in others they applied across the board. This variation in the ban's duration, stringency and coverage gives us power to identify its effect and filter out the effect of other concomitant country-specific events or policies. Our study also differs from Charoenrook and Daouk (2005), because it relies on individual stock market data rather than country market indices, and measures liquidity with bid-ask spreads and the Amihud illiquidity index rather than with trading volume, which is notoriously a problematic proxy for liquidity. This is particularly true of the crisis period, when large increases in bid-ask spreads have generally correlated with increases in trading volumes.

2.2 Speed of price discovery

The predicted effect of short-selling bans on the speed of price discovery is more clear-cut than it is for liquidity, as should be clear by the above discussion of the paper by Diamond and Verrecchia (1987): by preventing traders from short-selling, such a ban moderates the trading activity of informed traders who have negative information about fundamentals and thereby slows down price discovery, and does so asymmetrically – more in bear than in bull markets. Indeed this is precisely what regulators hope to achieve: preventing bad news from being rapidly impounded in stock prices, probably in the belief that such bad news is "excessive", in the sense that they reflect a negative bubble or herding behavior rather than fundamental information.

This prediction has been tested by Bris, Goetzmann and Zhu (2005) using data on short-sale restrictions for forty-six equity markets around the world. They find that that prices incorporate information faster in countries where short sales are allowed and practiced, implying that short-selling bans are associated with less efficient price discovery at the individual security level. These results are consistent with the evidence by Reed (2007) that short-selling bans determine an asymmetry in the price adjustment in response to earnings announcements. Moreover, both Saffi and Sigurdsson (2007) and Boehmer and Wu (2008) show that the ability to short sell stocks increases the informational efficiency of their prices.

Also on this score the present paper provides a new contribution, as it uses an international panel data set to investigate the effect of short sales on the speed of price discovery. Thus, while Bris et al. (2005) use cross-country variation in their data, we use time series variation due to the inception and lifting of bans within each country, sometimes differentially across stock classes, to identify the effect of bans on price discovery. Indeed, we completely remove "between" variation from our sample, as we include fixed stock-level effects.

2.3. Volatility

Here the predictions that one can draw from first principles are again ambiguous. Insofar as a short selling ban slows down price discovery, it may also decrease return volatility, since news will be impounded more slowly into prices. However, insofar as it widens bid-ask spreads, it increases the component of price volatility deriving from the bid-ask bounce.

Empirically, Boehmer, Jones and Zhang (2008) find that the 2008 ban in the United States has been associated with greater intraday volatility, and Ho (1996) finds that stock return volatility increased when short sales restrictions were imposed in the Singapore exchange in 1985-86. In contrast, the cross-country study by Charoenrook and Daouk (2005) reports that short-sale restrictions are associated with lower market-wide stock returns volatility.

Even if the correlation between volatility and short-selling bans were to be positive, however, it would be difficult to interpret the increase in volatility as being caused by short-selling bans. The reason is that the adoption of these bans may itself depend on stock return volatility: they tend to be imposed in turbulent times, in the hope of moderating stock price fluctuations, especially downward ones. So a positive association between volatility and short-selling bans may simply reflect the endogenous timing of policy.

2.4. Overpricing

The overpricing of individual stocks is the most thoroughly investigated of the possible effects of short-selling bans, especially using the U.S. stock market data. The overpricing effect is predicted by the model of Miller (1977), who notes that if short-selling is prohibited and investors have heterogeneous beliefs, only the valuation of the bullish investors and the bearish investors who currently own the stock is registered in the stock price. Bearish investors who do not own the stock do not participate in the market, so their valuations are not registered in the stock price. Hence, on average stocks are overvalued compared to the full-information prices, and stock prices decline when the short-selling prohibition is lifted.

3. Research method and expected form of the results

In this paper, we test for all the effects of short selling bans examined in the literature: (i) on liquidity, measured by the quoted spread and the Amihud illiquidity ratio; (ii) on the speed of price discovery, as captured by the extent to which stock returns correlate with past market returns as opposed to contemporaneous ones; and (iii) on the overpricing of stocks, as measured by the skewness of stock returns.

The hallmark of our approach is to exploit the panel structure of our data to identify the effect of short-selling bans. Specifically, we exploit the following features of the data:

(i) different introduction dates for different countries (e.g., Italy and Spain intervened later than the U.S.);

(ii) different removal dates for different countries (e.g., U.S. and Canada were the first countries to remove the ban);

(iii) some countries did not introduce the ban at all (e.g., some Scandinavian countries);

(iv) differentiation between stocks, as in some countries the bans were often imposed for financials only (e.g., in the U.S. and most European countries), while in others they applied to all the stocks (e.g., Japan, Italy, South Korea, and Spain);

(v) application details (stringency) differ a lot across countries: in some cases, short-selling bans were “naked”, i.e. only ruled out sales where the seller does not borrow (or arrange to borrow) the stock in time to deliver it to the buyer within the standard settlement period; in other cases, short-selling bans were “covered”, i.e. ruled out sales also where the seller manages to borrow the stock.

The methodology consists of controlling for unobserved heterogeneity due to stock and country characteristics that correlate with liquidity (stock characteristics such as risk, number of market makers, analyst coverage, capitalization and size of public float, and country characteristics such as insider trading regulation and enforcement). Since models of the bid-ask spread based on adverse selection and inventory holding risk suggest that risk is a potentially important determinant of bid-ask spread, we also control for the volatility of returns, or we include calendar time effects.

In our regression analysis, we measure short sales restrictions by three dichotomic variables, corresponding to different degrees of severity – the mildest restriction being the obligation to disclose short sales (Disclosure), the intermediate one being the ban on naked short sales (Naked Ban), and the strictest one being the ban on covered short sales as well (Covered Ban). To avoiding perfect multicollinearity problems arising from the contemporaneous presence of two types of restrictions or of all three, we set the Disclosure variable equal to 1 only when the obligation to disclose short sales is the *only* restriction imposed on short sellers. Similarly, the Naked Ban variable is set equal to 1 when *only* naked short sales are forbidden (covered ones being allowed). Finally, the Covered Ban variable is equal to one when covered short sales are also forbidden. This allows us to identify the effect of each of the three variables: the effect of Disclosure is identified by the observations in which it is the sole restriction on short sellers, and that of Naked Ban by those for which there is no ban on covered short sales as well.

Preliminary evidence based on a short sample suggests that short selling bans had a strong and negative impact on stock market liquidity. We expect to confirm these results with the full sample and to obtain additional evidence on cross-country differential effects, cross-sectional stock effects related to size and stock idiosyncratic risk, and more evidence on other market quality measures such as price discovery and skewness.

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PAST WORK EXPERIENCE

1985-8: Assistant Professor, University of Naples Federico II.

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OTHER PROFESSIONAL EXPERIENCE

1987: Visiting Scholat at MIT, Department of Economics.

1988: Distinguished Visitor at the Financial Markets Group, London School of Economics and Political Science.

1997-2005: Co-Director of the Research Programme in Financial Economics of the Centre for Economic Policy Research, London.

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EDITORIAL AND REFEREEING ACTIVITY

Managing editor of the *Review of Finance* (2003-present).

Associate editor of the *European Economic Review* (1994-97), *Giornale degli Economisti* (1997-99), *Ricerche Economiche* (1997-2000), and of the *Journal of the European Economic Association* (2003-2004).

Member of the *Economic Policy* discussion panel (1990-91, 1998-99)

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American Economic Review, Quarterly Journal of Economics, Review of Economic Studies, Journal of Finance, Review of Financial Studies, Journal of the European Economic Association, European Economic Review, Economic Journal, Journal of Public Economics, Journal of Business, Journal of Development Economics, Economic Letters, Economica, Oxford Economic Papers, Journal of Economic Dynamics and Control, Ricerche Economiche, Journal of International Money and Finance, Economic Notes, Economic Letters, and *The Manchester School.*

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8) "Self-regulation in Financial Markets" (with Ailsa Röell), *ibidem*.

9) "Auction Markets, Dealership Markets and Execution Risk" (with Ailsa Röell), in *Financial Market Liberalization and the Role of Banks*, edited by V. Conti and R. Hamaui, Cambridge University Press, 1993.

10) "Shifting Gears: An Economic Evaluation of the Reform of the Paris Bourse" (with Ailsa Röell), *ibidem*.

11) “Front Running, Stock Market Liquidity and Traders' Welfare” (with Ailsa Röell), *ibidem*.

12) “Government Incentives and Household Saving in Italy” (with Tullio Jappelli), in *Public Policies and Household Saving*, edited by J. M. Poterba, Chicago University Press, 1994.

13) “Personal Saving in Italy” (with Tullio Jappelli), in *International Comparisons of Household Saving*, edited by J. M. Poterba, Chicago University Press, 1994.

14) “Equity Trading I: the Evolution of European Trading Systems” (with Benn Steil), chapter 1 in *The European Equity Markets*, edited by B. Steil, The Royal Institute of International Affairs, London, 1996.

15) “Market Size, the Informational Content of Stock Prices and Risk: a Multi-asset Model and Some Evidence”, in *Decisions, Games and Markets*, edited by Pierpaolo Battigalli, Aldo Montesano and Fausto Panunzi, Kluwer Academic Publishers, 1997.

16) “The Changing Microstructure of European Equity Markets,” in *European Securities Markets: the Investment Services Directive and Beyond*, edited by Guido Ferrarini, Kluwer Law International, 1998.

17) “The Determinants of Saving: Lessons from Italy” (with Tullio Jappelli), in *Accounting for Saving: Financial Liberalization, Capital Flows and Growth in Latin America and Europe*, edited by Carmen Reinhart, Inter-American Development Bank, Latin American Research Network, 1999.

18) “Banche e distretti industriali: una relazione speciale?”, in *Lo sviluppo locale: un’indagine della Banca d’Italia sui distretti industriali*, edited by L. Federico Signorini, Meridiana Libri, 2000.

19) “Introduction”, in *Defusing Default: Incentives and Institutions*, edited by Marco Pagano, Johns Hopkins University Press, 2001.

20) “Information Sharing in Credit Markets: Theory and Evidence” (with Tullio Jappelli), forthcoming in *Defusing Default: Incentives and Institutions*, edited by Marco Pagano, Johns Hopkins University Press, 2001.

21) “La diversificazione del portafoglio delle famiglie italiane” (with Tullio Jappelli and Christian Julliard), *Il risparmiatore cerca fiducia - XIX Rapporto sul rispamio e sui risparmiatori in Italia*. Milano: Guerini e Associati, 2001.

22) "Law and Equity Markets: A Simple Model" (with Davide Lombardo), CSEF Working Paper No. 25, http:// www.csef.it/WP/wp25.pdf, and CEPR Discussion Paper No. 2276, http://www.cepr.org/pubs/dps/DP2276.asp, published in *Corporate Governance Regimes: Convergence and Diversity*, edited by Joe McCahery, Pieter Moerland, Theo Raaijmakers and Luc Renneboog, Oxford University Press, 2002, pp. 343-362.

23) "The Performance of European Stock Exchanges: Evidence from Listing Decisions", in *Capital Markets in the Age of the Euro: Cross-Border Transaction, Listed Companies and Regulation*, edited by Guido Ferrarini, Klaus Hopt and Eddy Wymeersch, Kluwer Law International, 2002.

24) "Public Credit Information: A European Perspective" (with Tullio Jappelli), CSEF Working Paper No. 35, http://www.csef.it/WP/wp35.pdf, published in *Credit Reporting Systems and the International Economy*, edited by Margaret Miller, MIT Press, 2003, pp. 81-114.

25) "Role and Effects of Credit Information Sharing" (with Tullio Jappelli), CSEF Working Paper No. 36, http://www.csef.it/WP/wp36.pdf, published in *The Economics of Consumer Credit: European Experience and Lessons from the US*, Giuseppe Bertola, Richard Disney and Charles Grant, editors. Cambridge: MIT Press, 2006.

26) "Legal Determinants of the Return on Equity" (with Davide Lombardo), CSEF Working Paper No. 24, October 1999, http://www.csef.it/WP/wp24.pdf, and CEPR Discussion Paper No. 2275, November 1999, http://www.cepr.org/pubs/dps/DP2275.asp, published in *Corporate and Institutional Transparency for Economic Growth in Europe*, edited by Lars Oxelheim, Oxford: Elsevier, 2006.

27) "Financial market integration under EMU" (with Tullio Jappelli), CSEF Working Paper No. 197, April 2008, http://www.csef.it/WP/wp197.pdf, and CEPR Discussion Paper No. 7091, December 2008, http://www.cepr.org/pubs/dps/DP7091.asp, forthcoming in *Euro - The First Decade*, edited by Marco Buti et al., Cambridge University Press.

BOOKS

1) *Defusing Default: Incentives and Institutions* (editor). Washington: Johns Hopkins University Press, 2001.

2) *New Research in Financial Markets* (editor with Bruno Biais). Oxford: Oxford University Press, 2001.

3) *New Research in Corporate Finance and Banking* (editor with Bruno Biais). Oxford: Oxford University Press, 2002.

PUBLICATIONS IN ITALIAN JOURNALS

1) "The Impact of Fiscal Policy and Inflation on National Saving: The Italian Case" (with Franco Modigliani and Tullio Jappelli), *Banca Nazionale del Lavoro Quarterly Review*, June 1985.

2) "Consumo, indebitamento delle famiglie e razionamento del credito" (with Tullio Jappelli), *Giornale degli Economisti e Annali di Economia*, n. 11-12, 1988.

3) "Banche commerciali e banche cooperative: qual è la differenza?" (with Fausto Panunzi), in *Cooperazione di Credito*, n. 156-157, April 1997.

4) "Osservazioni sulla riforma della disciplina dell'OPA, degli obblighi di comunicazione del possesso azionario e dei limiti agli incroci azionari" (with Fausto Panunzi and Luigi Zingales), *Rivista delle Società*, No. 1, 1998.

5) "Consolidation in the Banking Industry: Causes and Consequences," *Rassegna Economica*, LXIII, No. 1, 1999.

6) "Households' Portfolio Diversification" (with Christian Julliard and Tullio Jappelli), CSEF Working Paper No. 180, http://www.csef.it/WP/wp180.pdf, published in Italian under the title "La diversificazione del portafoglio delle famiglie italiane", in *Il risparmiatore cerca fiducia: XIX Rapporto sul rispamio e i risparmiatori in Italia*. Milano: Guerini e Associati, 2001.

7) "The Modigliani-Miller Theorems: A Cornerstone of Finance," CSEF Working Paper No. 139, http://www.csef.it/WP/wp139.pdf, published in *Banca Nazionale del Lavoro Quarterly Review*, vol. 58, No. 233-234, June-September 2005, 237-247.

WORKING PAPERS AND UNPUBLISHED MANUSCRIPTS

1) “Norm Flexibility and Private Initiative” (with Giovanni Immordino and Michele Polo), CSEF Working Paper No. 163, http://www.csef.it/WP/wp163.pdf, September 2006.

2) “Corporate Fraud, Governance and Auditing” (with Giovanni Immordino), CSEF Working Paper n. 203, http://www.csef.it/WP/wp203.pdf, September 2008, CEPR Discussion Paper No. 7104, http://www.cepr.org/pubs/dps/DP7104.asp, December 2008, and ECGI Finance Working Paper No. 237/2009, http://ssrn.com/abstract=1337909, November 2008,

3) “Inheritance Law and Investment in Family Firms” (with Andrew Ellul and Fausto Panunzi), CSEF Working Paper no. 204, http://www.csef.it/WP/wp204.pdf, and CEPR Discussion Paper No. 6977, http://www.cepr.org/pubs/dps/DP6977.asp, September 2008.

4) “Households’ Indebtedness and Financial Fragility” (with Tullio Jappelli and Marco Di Maggio), CSEF Working Paper n. 208, http://www.csef.it/WP/wp208.pdf, October 2008, and CEPR Discussion Paper No. 7091, http://www.cepr.org/pubs/dps/DP7091.asp, December 2008.

5) “Securitization, Disclosure and Liquidity” (with Paolo Volpin), CSEF Working Paper n. 210, http://www.csef.it/WP/wp210.pdf, and CEPR Discussion Paper No. 7105, http://www.cepr.org/pubs/dps/DP7105.asp, December 2008.

6) “Multiple-Bank Lending, Creditor Rights and Information Sharing” (with Alberto Bennardo and Salvatore Piccolo), CSEF Working Paper n. 211, http://www.csef.it/WP/wp211.pdf, December 2008, and CEPR Discussion Paper No. 7105, http://www.cepr.org/pubs/dps/DP7186.asp, February 2009.

7) “Credit Ratings Failures: Causes and Policy Options” (with Paolo Volpin), paper prepared for the *Economic Policy* panel to be held on 23-24 October 2009.

HONOURS, SCHOLARSHIPS AND AWARDS

1979-80: Mediocredito Centrale “Marco Fanno” prize; Luigi Einaudi Foundation Award.

1980-81: Banca d'Italia “Bonaldo Stringher” Scholarship.

1981-83: research grants awarded by Ente “Luigi Einaudi” per gli Studi Monetari Bancari e Finanziari.

1983-84: research grant awarded by Consiglio Nazionale delle Ricerche.

1985: Sloan Fellowship awarded by M.I.T., Department of Economics.

1986: Cambridge University Honorary M.A.

1986-present: Fellow of the Centre for Economic Policy Research (CEPR).

1987: N.A.T.O. Junior Science Research Fellowship.

1989-2003: research grants awarded by the Italian Ministry of Education, Universities and Research and the National Research Council.

1996: medal awarded by the University of Helsinki. Research prize awarded by the Università Commerciale "Luigi Bocconi", Milan.

1997: BACOB European Prize for Economic and Financial Research, joint with Ailsa Röell.

2002-present: Fellow of the European Corporate Governance Institute (ECGI).

2004-present: Fellow of the European Economic Association (EEA), lifetime award.

2005: Egon Zehnder International Prize for the best paper in the ECGI Finance Working Paper series.

2007-present: Commendatore dell'Ordine al Merito of the Republic of Italy, lifetime award.

2009: Fellow at the Italian Academy for Advanced Studies in America, Columbia University (January-April).

CONSULTANCIES AND MEMBERSHIP IN SCIENTIFIC COMMITTEES

1990: consultant to the New York Stock Exchange (preparation of a report on "How Thin Financial Markets Operate" with Ailsa Röell).

1995-96: consultant to the Inter-American Development Bank (preparation of a paper on "The Determinants of Saving: Lessons from Italy" with Tullio Jappelli).

1995-96: consultant to the Italian Treasury's commissions for the implementation of the Investment Services Directive and for the reform of securities law.

1996-8: consultant to the Italian Stock Exchange.

1997-2001: member of the Italian Treasury's Consulting Committee on Privatizations.

1997-2001, 2007-present: member of the Council of the European Economic Association.

1997-2002: member of the Scientific Committee of the Commissione Nazionale per le Società e la Borsa (stock exchange supervisory agency).

1997-8: consultant to the Inter-American Development Bank for the direction of a research project on "Institutional Arrangements to Ensure Willingness to Pay in Financial Markets: A Comparative Analysis of Latin America and Europe".

1998: member of the Italian Treasury's Commission for the reform of corporate law.

1999: consultant to the World Bank for the project "Upgrading Credit and Lease Registry Information Systems in the East Asia Region through Effective Use of Information Technologies" and to the World Bank for the project on "Credit Information".

2000: consultant to Coopers & Lybrand for the evaluation of the system of EU-financed incentives to Italian industrial companies, 2000-2006 action plan; consultant to Assonime for a report on the impact of the European stock exchange mergers on Italian listed companies.

2001: consultant to the European Central Bank and the EU Commission.

2001-present: chairman of the Scientific Committee of MTS.

2002-2004: member of the European Parliament advisory panel of financial services experts, and of the Scientific Committee of the Europlace Institute of Finance.

2002-present: Member of the Steering Committee of the ECB-CFS Research Network on "Capital Markets and Financial Integration in Europe".

2002-present: member of the Research Committee of the European Corporate Governance Institute (ECGI).

2004-present: member of the Research Committee of Unicredit.

2005-present: member of the International Scientific Council of Finrisk (Swiss university network specializing in research on valuation and risk management).

2006-2008: member of the Scientific Committee of Confindustria.

ORGANIZATION OF WORKSHOPS, CONFERENCES AND RESEARCH PROJECTS

1) Annual Meeting of the European Economic Association, member of the Programme Committee: 2nd Meeting, Copenhagen, 22-24 August 1987; 4th Meeting, Augsburg, 22-24 August 1989; 9th Meeting, Maastricht, 3-5 September 1994; and 14th Meeting, Santiago de Compostela, 2-4 September 1999.

2) European Meeting of the Econometric Society, member of the Programme Committees in Economic Theory: Cambridge, 2-6/9/91; and 1992.

3) Workshop on “Volatility, Crashes and Asymmetric Information in Speculative Markets,” sponsored by the Centro Interuniversitario di Studi Teorici per la Politica Economica (STEP) and the Centre for Economic Policy Research (CEPR), Milan, 26-27/5/89 (organized with Riccardo Rovelli and Giovanna Nicodano).

4) Workshop on “Financial Intermediation and Saving Behaviour,” sponsored by the STEP and the CEPR, Milan, 5/5/90 (organized with Orazio Attanasio).

5) *Economic Policy* Panel (member, 1990-91, and 1998-99).

6) Workshop on “Market Microstructure,” sponsored by the CEPR-ESF Network in Financial Markets, Konstanz, 3-4/4/92 (organized with Günter Franke).

7) Invited papers session on “Financial Markets and the Macroeconomy,” 7th Annual Meeting of the European Economic Association, Dublin, 28-30/8/92 (co-ordinator).

8) Conference on “Financial Markets and Real Economic Behaviour,” sponsored by the CEPR-ESF Network in Financial Markets, Madrid, 14-15/12/92 (organized with Jean-Pierre Danthine and Rafael Repullo).

9) Conference on “International Capital Mobility: Macro Evaluation of Economic Integration,” sponsored by The Pinhas Sapir Center for Development and the CEPR, Tel-Aviv, 20-21/12/92 (organized with Assaf Razin and Leonardo Leiderman).

10) NBER Project on International Comparisons of Personal Saving, directed by Prof. James M. Poterba, 1992-93 (coordinator of the Italian research team).

11) Member of the Executive Board of the CEPR-ESF Network in Financial Markets (1991-96)

12) International research project on “The Flotation of Companies and the Role of the Stock Market,” funded by the Ente “Luigi Einaudi” per gli Studi Monetari Bancari e Finanziari (coordinator with Ailsa Röell), 1992-94.

13) International research project on “Banking, Institutions and Legal Enforcement,” funded by the Banca Commerciale Italiana (coordinator with Patrick Bolton and Rony Hamaui), 1992-95.

14) CEPR Workshop on “Finance and Macroeconomics,” Champoussin, 14-16/1/94 (coordinator with Philippe Weil and Jean-Pierre Danthine).

15) Workshop on “Market Microstructure,” sponsored by the CEPR-ESF Network in Financial Markets, Konstanz, 25-26/3/94 (coordinator with Günter Franke).

16) CEPR Network on “Finance in Europe: Markets, Instruments and Institutions,” funded by the EC under HCM contract ERBCHRXCT940653 (leader of the team working on *Securities and Market Microstructure*).

17) CEPR Workshop on “Market Microstructure,” Instituto de Anàlisi Econòmica, Barcelona, 16-17/2/96 (coordinator with Xavier Vives and Günter Franke).

18) CEPR and CNR-ISFSE Workshop on “The Location of Financial Activity,” Napoli, 17-18/5/96 (coordinator with Thomas Gehrig and Jacques Thisse).

19) Training and Mobility of Researchers (TMR) Network Research Project on “The Industrial Organization of Banking and Financial Markets in Europe”: coordinator of the research unit of the Department of Economics of the University of Salerno since 1998.

20) CEPR/ESI Conference on “The Changing European Financial Landscape”, hosted by the National Bank of Belgium, Brussels, 24-26 September 1998.

21) International research project on “Institutional Arrangements to Ensure Willingness to Pay in Financial Markets: A Comparative Analysis of Latin America and Europe”, funded by the Inter-American Development Bank Research Project (IADB) and the OECD, 1997-98 (coordinator).

22) CEPR/CSEF Euroconference on *Core Competencies, Diversification and the Role of Capital Markets,* Naples, 28-30 January 1999 (coordinator with Patrick Bolton).

23) Summer Symposium in Financial Markets, CEPR and Studienzentrum Gerzensee: 3rd Symposium (1993, coordinator with Ron Anderson and Colin Mayer), 5th Symposium (1995, coordinator with Enrique Sentana), 8th Symposium (1998, coordinator with Rafael Repullo and Ernst-Ludwig Von Thadden) and 9th Symposium (1999, coordinator with Bruno Biais and Ernst-Ludwig Von Thadden).

24) Society of Financial Studies Conference on Price Formation, Tolosa, 19-20 January 1999 (member of the Programme Committee).

25) Research and Training Network (RTN) on “Understanding Financial Architecture: Legal and Political Frameworks and Economic Efficiency”: coordinator of the research unit of the Department of Economics of the University of Salerno since 2000.

26) Research and Training Network (RTN) on “Financing Retirement in Europe: Public Sector Reform and Financial Market Development”: coordinator of the research unit of the Department of Economics of the University of Salerno since 2002.

27) Annual Meeting of the European Finance Association, member of the Programme Committee: Berlin, 2002; Glasgow, 2003; Maastricht, 2004; Moscow, 2005; Zurich, 2006; Athens, 2008; Bergen, 2009.

28) Annual Meeting of the American Finance Association, member of the Programme Committee: Atlanta, 2002; San Diego, 2004.

29) Western Finance Association Annual Meeting (member of the Program Committee): from 1998 to 2007.

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Education

Ph.D., Economics & Management, St. Anna School of Advanced Studies, Italy, 2003.
Committee: Michael Brandt (Chair), Andrea Beltratti, Luca Erzegovesi, Marco Lippi, Giulio Bottazzi.

Visiting Ph.D., Finance, The Wharton School, University of Pennsylvania, 2000 – 2002.

Laurea, Economics, *Summa cum Laude*, University of Trento, Italy, 1997.

Employment

Associate Professor (with tenure), Amsterdam Business School, 2008 – current.

Center for Economic Policy Research (CEPR), Research Affiliate, 2009 – current.

Visiting Assistant Professor, London Business School, Spring 2007

Visiting Scholar, GSB, Columbia University, Spring 2006

Assistant Professor, HEC, University of Lausanne, Switzerland, 2003 – 2008.

Lecturer, Finance Department, The Wharton School, University of Pennsylvania, 2002.

Postdoctoral Fellow, University of Trento, Italy, 2003.

Asset Manager, Cassa Centrale Casse Rurali Trentine Spa, Italy, 1997 – 1999.

Technical Analyst, Forinvest Sim Spa, Italy, 1996.

Research Interests

Empirical Asset Pricing, Derivatives, Market Microstructure, Corporate Risk Management.

Publications

Beber, Alessandro, and Michael W. Brandt, When it can't get any better or worse: The asymmetric impact of good and bad news in expansions versus recessions, *Review of Finance*, forthcoming.

Beber, Alessandro, and Michael W. Brandt, Resolving Macroeconomic Uncertainty in Stock and Bond Markets, *Review of Finance*, lead article, forthcoming.

Beber, Alessandro, Michael W. Brandt, and Kenneth Kavajecz, Flight-to-Quality or Flight-to-Liquidity? Evidence from the Euro-Area Bond Market, *Review of Financial Studies*, lead article, forthcoming.

Beber, Alessandro, and Michael W. Brandt, 2006, The Effect of Macroeconomic News on Beliefs and Preferences: Evidence from the Options Market, *Journal of Monetary Economics* 53, 1997–2039.

Working Papers

Beber, Alessandro, Michael W. Brandt, and Kenneth Kavajecz, *What Does Equity Sector Orderflow Tell Us about the Economy?*, Last revised: April 2009. Resubmitted.

Beber, Alessandro, and Daniela Fabbri, *Who Times the Foreign Exchange Market? Corporate Speculation and CEO Characteristics.* Last Revised: September 2008. Accepted EFA 2005 and AFA 2006. Being revised for resubmission.

Beber, Alessandro, Francis Breedon and Andrea Buraschi, *Difference in Beliefs and Currency Risk Premia*, Last Revised: April 2009. Accepted EFA2007, Duke-UNC2007, and AFA2008. Submitted.

Beber, Alessandro, and Marco Pagano, *Short Selling Bans and Market Liquidity: Evidence from the 2007-09 Crisis*, in preparation.

Beber, Alessandro, and Michael W. Brandt, *Common risk factors in FX returns*, in preparation.

Beber, Alessandro, and Cecilia Caglio, *Order Submission Strategies and Information: Empirical Evidence from the NYSE.* Last Revised: November 2005.

Beber, Alessandro, *The Mispricing of Options: Determinants and a Simple Remedy.* Last Revised: May 2003.

Book Chapters

Kasabov, Nikola, Luca Erzegovesi, Mario Fedrizzi, Alessandro Beber, and Da Deng, 2000, *Hybrid Intelligent Decision Support Systems and Applications for Risk Analysis and Prediction of Evolving Economic Clusters in Europe*, in: N. Kasabov (ed.), Future directions for intelligent information systems and information sciences, Springer Verlag, 347-372.

Teaching Experience

Derivatives, Master International Finance, University of Amsterdam, 2008 – current.
Finance II, EMBA, University of Amsterdam, 2008 – current.
Asset Pricing I, Ph.D. in Finance, University of Amsterdam, 2008 – current.
Caput Derivatives, MSc Business Economics, University of Amsterdam, 2008 – current.
Capital Markets and Risk Management, MBA, IMD, 2007.

Cases in Financial Engineering, M.Sc. in Finance, HEC Lausanne, 2007 – 2008 (designed new course)

Principles of Finance, M.Sc. in Finance, HEC Lausanne, 2005 – present, last evaluation 3.6 over 4.

Derivatives and their application, Investment Management Program, Exec, LBS, 2007.

Corporate Finance, MBA, HEC Lausanne, 2003 – 2007, last evaluation 3.8 over 4.

Derivatives, International Wealth Management Executive MBA (IWEMBA), Swiss Banking School, 2005 – 2006, evaluated 4.6 over 5.

Financial Engineering, International Wealth Management Executive MBA (IWEMBA), Swiss Banking School, 2005 – 2006, evaluated 4.5 over 5.

International Finance II, Master International Management, HEC Lausanne, 2003 – 2005, last evaluation 4.3 over 5

Empirical Methods in Finance, Master Banking and Finance, HEC Lausanne, 2003 – 2005, last evaluation 4.6 over 5

Speculative Markets, FNCE717, MBA level, The Wharton School, 2002.

Speculative Markets, FNCE206, undergraduate level, The Wharton School, 2002.

Introduction to Asset Pricing, Ph.D. level, St. Anna School of Advanced Studies, 2002.

Financial Markets, undergraduate level, University of Trento, 1998.

Awards and Grants

Barclays Global Investors Prize for "The Effect of Macroeconomic News on Beliefs and Preferences: Evidence from the Options Market" as best symposium paper at the 2003 European Finance Association meeting.

Best Professor of the MBA program, HEC Lausanne, 2003-2004

Best Professor of the MBA program, HEC Lausanne, 2004-2005

Fellowship, Young Researchers, Italian Ministry of University and Research, 2001.

Fellowship, Alea Financial Risk Research Center, 1999.

Award, Outstanding graduation, Servizi Interbancari Spa, 1997.

Professional Service

Referee for *Journal of Finance*, *Journal of Financial Economics*, *Review of Finance*, *Journal of Financial Intermediation*, *Journal of International Money and Finance*, *Journal of Money, Credit, and Banking*, *Finance Research Letters.* Program Committee EFA 2006, EFA2007, EFA2008, Session Chair EFA 2006, EFA2007.

Invited Presentations

Conferences

2008: AFA New Orleans, ASAP conference (discussion).
2007: Duke-UNC Asset Pricing conference, MTS Conference - Rome (discussion), Unicredit Banking Conference - Naples (discussion), Imperial Hedge Fund Strategies conference, AFA Chicago, Skinance, Cambridge CERF, EFA Llubjana (presentation and discussion), CEPR Gerzensee.

2006: AFA Boston, Second Empirical Asset Pricing Retreat Amsterdam (discussion), MTS Conference on Financial Market Microstructure, EFA Zurich (presentation and discussion), LBS-LSE-Oxford Adam Smith Asset Pricing Conference, CEPR Gerzensee.

2005: Cass Business School Conference London (two presentations), First Empirical Asset Pricing Retreat Amsterdam (discussant), EFA Moscow (presentation scheduled)

2003: NBER Fall Asset Pricing Meeting (by coauthor), Annual Meeting of the European Finance Association (two presentations and two discussions), MTS Conference on Financial

Market Microstructure.

Seminars

2009: Oslo BI (scheduled), Warwick (scheduled), Athens (scheduled), Tilburg (scheduled).
2008: Free University of Amsterdam.
2007: University of Zurich, Bank of Italy, University of Belfast, London Business School, University of Amsterdam, HEC Paris, University of Oxford, LSE.

2006: Columbia University (two presentations), University of North Carolina, Baruch College, Federal Reserve Bank of New York, University of Venice.

2005: University of St. Gallen.

2004: ISCTE, Bank for International Settlements, INSEAD.

2003: University of Georgia, University of Amsterdam, University of Reading, Università Bocconi, University of Lausanne, ESSEC Business School, Bank of Italy, Duke University.

2002: St. Anna School of Advanced Studies.

References

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Prof. Kenneth Kavajecz School of Business University of Wisconsin Madison, WI 53706	Phone: +1 (608) 265-3494	kkavajecz@bus.wisc.edu
Prof. Bernard Dumas HEC University of Lausanne Switzerland, CH-1015	Phone: +41 21 692 3650	Bernard.Dumas@unil.ch