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THE RISK OF OTC DERIVATIVES
CANADIAN LESSONS FOR EUROPE AND THE G20

CHIARA OLDANI

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Chiara Oldani

67 Erb Street West
Waterloo, Ontario N2L 6C2
Canada
tel +1 519 885 2444 fax +1 519 885 5450
www.cigionline.org

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ABOUT THE AUTHOR

Chiara Oldani is a CIGI visiting scholar and professor of monetary economics in the Department of Economics and Business at the University of Viterbo "La Tuscia," Italy. Chiara is a member of the scientific committee of the Fondazione Ugo La Malfa, a research associate at the Centre for Applied Macroeconomic Analysis at Australian National University and the director of research at the Rome-based Assonebb. She has been a visiting scholar at the Cambridge Endowment for Research in Finance at the University of Cambridge and at the Wharton School at the University of Pennsylvania. She has taught at Luiss Guido Carli University and the Italian Society for International Organization in Rome.

Chiara has published dozens of academic papers and book chapters, four books and newspaper articles, both in English and Italian, on topics including Greek sovereign risk, derivatives and fiscal policy, and the global financial crisis. She has a Ph.D. in monetary and financial economics from Tor Vergata University and an M.Sc. in economics from the University of Warwick.

ACRONYMS

BIS	Bank for International Settlements
CCP	central counterparty
CDIC	Canada Deposit Insurance Corporation
CFPB	Consumer Financial Protection Bureau
CRR/CRD IV	capital requirements regulation/capital requirements directive
ECB	European Central Bank
EMIR	European Market Infrastructure Regulation
EU	European Union
FISC	Financial Institutions Supervisory Committee
FSB	Financial Stability Board
FSOC	Financial Stability Oversight Council
G7	Group of Seven
G20	Group of Twenty
GASB	Governmental Accounting Standards Board
IAS	International Accounting Standard
IFRS	International Financial Reporting Standards
IMF	International Monetary Fund
LTCM	Long-Term Capital Management L.P.
MiFID	Markets in Financial Instruments Directive
MiFIR	Markets in Financial Instruments Regulation
OCR	Office of Credit Ratings
OLA	Orderly Liquidation Authority
OSFI	Office of the Superintendent of Financial Institutions
OTC	over-the-counter
SIFI	systemically important financial institution

EXECUTIVE SUMMARY

Over-the-counter (OTC) derivatives played an important role in the buildup of systemic risk in financial markets before 2007 and in spreading volatility throughout global financial markets during the crisis. In recognition of the financial and economic benefits of derivatives products, the Group of Twenty (G20), under the auspices of the Financial Stability Board (FSB), moved to regulate the use of OTC derivatives. Although a number of scholars have drawn attention to the detrimental effects of the United States and the European Union (EU) to coordinate OTC reform, this overlooks an important aspect of the post-crisis process: the exemption of non-financial operators from OTC derivative regulatory requirements. Critically, they remain exempt under existing legislation regardless of the risks they continue to pose through unreported trades and counterparty risks to financial firms; there is still uncertainty around the pricing of derivatives (i.e., model risk) for non-financial operators that could pose a risk to the financial system. Nevertheless, the lack of coordination between the United States and European Union is detrimental for consistency and coherence among financial sectors. These, and similar inconsistencies in financial regulation, pose risks of conflict and fragmentation that should soon be addressed by the G20. The paper concludes by discussing what lessons can be learned from Canada, after it successfully avoided the worst of the crisis and contained the systemic risks posed by OTC derivatives before and after it.

INTRODUCTION

The financial crisis proved that OTC derivatives, while not the cause of the disaster, need regulation and monitoring. After 2009, the G20 addressed the role of OTC contracts and, together with the FSB, promoted financial reforms to guarantee stability and resilience of the global financial system. Derivatives played a prominent role in spreading the risks out from their origin: the US subprime mortgage market. As most economists agree, the financial crisis has not only been the product of an excessive credit and asset bubble, but also of "poorly designed liberalization, ineffective regulation and supervision, and poor interventions" (Claessens et al. 2014, 3). The improper use of derivatives, the high concentration and deep interconnections in the market, as well as the absence of transparency and standardization, contributed to spreading out the worst effects of the crisis. The G20 has been the place where strategic decisions to restore confidence have been taken, and it has gained increasing attention among international fora by playing a unique role in addressing the weaknesses of the fragmented global financial system and in undertaking global reforms (Knight 2014). However, a few gaps still need to be addressed in order to effectively achieve financial stability and promote growth.

The FSB and G20 have taken steps toward regulating financial operators (such as banks and financial intermediaries) to improve their capitalization, reduce their systemic adverse effects, reduce the costs of bailouts and help the credit channel to work properly; they paid attention to use of OTC derivatives by financial operators (as opposed to non-financial operators) to reduce their risks. Important regulatory efforts have been taken to safeguard taxpayers' money, but there is still work to do. In November 2014, G20 leaders met in Australia and confirmed that a few gaps need to be closed in the financial system, in particular in the OTC derivatives markets, and that reforms of OTC derivatives need rapid implementation.

Ongoing regulatory reform efforts, although moving in the right direction, are still filled with some holes: regulatory reforms developed by G20 countries after 2009 failed to consider the consistency among national regulation and this poses a risk of conflict and fragmentation in global financial markets (Eichengreen and Park 2012). Regulatory inconsistency has significant effects on growth and development for all G20 countries because of deep financial linkages. In particular, the lack of transatlantic consistency between the European complex regulatory framework and the US Dodd-Frank Wall Street Reform and Consumer Protection Act (hereafter the Dodd-Frank Act) further decreased the ability to react effectively to unexpected events, but this lack of consistency can be reduced by means of greater regulatory coordination by the G20.

A still under-analyzed gap in post-crisis reforms is the regulatory issues arising from non-financial operators and their exemption from OTC derivatives reforms. Non-financial operators' trading of OTC derivatives does not often take place under the new regulatory umbrella because of their limited institutional size, lack of capital requirements or absence of accounting rules. According to Bank for International Settlements (BIS) data, 12 percent of the global OTC market in 2014 was comprised of trading by firms, sovereigns, local administrations and other non-financial institutions. This relatively small dimension of non-financial trading should not limit our consideration of the potential risk involved, since domino effects have the potential to spread through the deep interconnectedness of the global financial system. Before 2007, few would have imagined that a tiny market like that of subprime mortgages[1] would have created such a global disaster (see, for example, Gramlich 2004).

Among Group of Seven (G7) countries, Canada experienced the shortest downturn after the financial crisis. Its strong connection with the United States did not alter the growth path after 2009, while moral suasion

1 In 2007, the subprime mortgage market accounted for around 12 percent of the entire mortgage market.

on financial players and swift actions undertaken to strengthen the weakest parts of its financial system represented a successful action plan.

This paper: describes the role of financial derivatives in the crisis; examines the regulatory efforts in global financial regulation; depicts the gaps left in the post-crisis reforms, in particular those dealing with non-financial operators, its challenges and the model risk; considers the regulatory issues arising from non-financial operators and the OTC derivatives market; and describes the Canadian experience.

ROLE OF DERIVATIVES IN THE CRISIS

Derivatives were originally created as a risk management tool to help firms limit their various risk exposures incurred during traditional lending activities. However, the derivatives market evolved into a risk-taking tool rather than a risk management tool, demonstrating that under certain circumstances derivatives can contribute to financial instability. Before the crisis, derivatives were traded after being pooled into securitized instruments that were extremely difficult to price. These investment vehicles were so complex that their inherent risk was essentially unknown. That said, although not necessarily the "cause" of the financial crisis, OTC derivatives played an instrumental role in amplifying the detrimental effects of the disaster. Had OTC derivatives been properly regulated, the global financial system may not have been hit so hard and the accompanying recession might not have been so deep and costly.

The poorly regulated OTC derivatives market managed to magnify the risks and costs of the relatively small subprime mortgage market (see Gramlich 2004). Beginning with the US subprime mortgage market, OTC derivatives effectively exposed all conceivable corners of the financial system to the underlying risks. As most economists agree, the financial crisis, in addition to being a product of an excessive credit and asset bubble, was largely a result of "poorly designed liberalization, ineffective regulation and supervision, and poor interventions" (Claessens et al. 2014, 3). The improper use of derivatives, the high concentration and deep interconnections in the market, and the absence of transparency and standardization all contributed to the sweeping impacts the world experienced.

REFORM EFFORTS AFTER THE CRISIS

After the crisis, there was a widely held view that "regulators should not turn back the clock but should, instead, improve the stability of this interconnected financial system by minimising regulatory arbitrage and increasing transparency" (Koszner and Strahan 2011, 245). OTC derivatives, the least regulated form of financial derivatives, currently comprise about 90 percent of the global derivatives markets and, despite the post-crisis economic stagnation, the market has continued to grow, surpassing US$690 trillion[2] in June 2014 (BIS 2014a). Mindful of this, the FSB and G20 have taken steps toward regulating financial operators' use of OTC derivatives. The ongoing reforms, intending to create a more resilient and transparent OTC derivative market, have focused on: standardizing OTC derivatives and promoting trading on exchanges and electronic platforms; mandating reporting to trade repositories; central counterparty (CCP) clearing; capital treatment of banks' derivative positions; and minimum margin requirements for non-centrally cleared contracts. The main thrust of these reforms is to bring previously opaque derivative trading practices back on to transparent platforms, alongside additional prudential measures targeting financial firms and trading infrastructures.

Viral Acharya, Thomas Philippon, Matthew Richardson and Nouriel Roubini (2009) review the causes and consequences of the financial crisis and call for more transparency to reduce the counterparty risk in the OTC market. Specifically, they argue that standardization, CCP clearing and improved accounting criteria for financial operators are the key pillars for building a new global financial architecture (ibid.). Following this approach, the United States introduced the Dodd-Frank Act in 2010, the most relevant and comprehensive financial regulatory reform ever issued by Congress. It aims to reduce the risks of the financial system and enhance stability by establishing a number of new government agencies tasked with overseeing various components of the act. These agencies are the Financial Stability Oversight Council (FSOC), Orderly Liquidation Authority (OLA), Consumer Financial Protection Bureau (CFPB) and the Securities and Exchange Commission's Office of Credit Ratings (OCR). The FSOC and the OLA monitor the financial stability of major firms — systemically important financial institutions (SIFIs) — whose failure could have a major negative impact on the economy. The CFPB should prevent predatory credit and lending, increase information available to consumers and reduce moral hazard of brokers. Since credit rating agencies were accused of giving misleading ratings that contributed to the financial crisis, the OCR should ensure that agencies provide meaningful and reliable credit ratings of the entities they evaluate. A very important piece of reform is the "Volcker rule," named after the former chairman of the Federal Reserve System Board, Paul Volcker. It disallows short-term proprietary trading of securities, derivatives, commodity futures and options on these instruments for banks' own accounts under the premise that these activities do not benefit banks' customers. The Volcker rule should limit speculative trading, eliminate proprietary trading by banks and regulate financial firms' use of derivatives in an attempt to prevent SIFIs from taking large risks that might alter the stability of the broader economy. The Dodd-Frank

2 As measured with the notional amount outstanding.

Act also contains a provision for regulating derivatives such as the credit default swaps.

In 2009, the European High-level Working Group, chaired by Jacques de Larosière, created a framework to establish a new regulatory agenda, stronger and coordinated supervision, and to introduce an effective crisis risk management procedure. Since then, the European Union has issued directives and regulations: capital requirements regulation and directive (CRR/CRD IV) for transitioning the Basel III framework into domestic systems; European Market Infrastructure Regulation (EMIR) for introducing central clearing of OTC derivatives; Solvency II for enhancing the insurance market; and Markets in Financial Instruments Directive II (MiFID II) and Markets in Financial Instruments Regulation (MiFIR) for improving the workings of the financial market (see Appendix for further details; see European Commission 2012; 2013; 2014a; 2014b). Tighter European regulation — through reducing risks for individual banks and insurance companies and increasing the information available on financial markets — is effectively lowering the probability of banking and financial crises, thus making the system sound and more resilient.

The new European regulatory and supervisory framework has been criticized for reducing the degree of competition in the financial system and for protecting insiders, while the Dodd-Frank Act has been accused of being too expensive for the federal budget and also for consumers, since it cannot impede the shift of new extra costs on final customers, to the detriment of competition. The probability of achieving stronger and more stable long-run growth under the new regulatory system depends on the degree of coordination among financial systems and their ability to recognize and close the regulatory gaps seen in the recent past.

The BIS (2013) established a group — the Macroeconomic Assessment Group on Derivatives — to study the macroeconomic impact of the new regulatory framework for OTC derivatives. The group compared the economic costs and benefits of planned reforms, identifying the long-run benefit to be the reduced probability of economic and financial crises that positively affects growth. The short- and long-term costs of planned reforms are relevant for the global financial system, but the lack of data on detailed bilateral trading exposure, together with the uncertainty over the final regulatory scenario, limit the extent of the analysis. This further restricts the ability to evaluate whether the long-run benefits of the new regulatory framework exceed the costs.

Other than the probable gains and losses associated with the post-crisis regulatory effort, an important feature has been a lack of transatlantic coordination between the United States and the European Union. Generally speaking, the US and EU are advanced in adopting new rules relative to other G20 countries, but accompanying these advancements is a detrimental inconsistency and coherence between the two systems. They are similar as far as intended goals are concerned — their priorities include increasing transparency and efficiency of financial markets, especially OTC derivative market — but they diverge in the implementation stages. Granted, one contributing factor to the divergence stems from difficulties experienced due to complexities inherent in all derivative market-related reforms (Schindelhaim 2014). Moreover, additional differences in reform only add to the misalignment of policies. One example is the differing stances on CCP clearing and clearing obligations: in the US, clearing requirements apply to those trading an eligible contract (certain entities, including non-financial ones, may be exempt when engaged in activities such as hedging). Differently, in the EU, exemptions are granted based on magnitude of a non-financial entity's derivatives position (Lambert et al. 2011), rather than the nature of their actions.

Divergent rules on capital, liquidity, derivatives and banking structure create regulatory misalignments that provide incentives for beggar-thy-neighbour and race-to-the-bottom policies in terms of competition and price to the detriment of financial market stability (Deutsch 2014). With respect to bank capital, the EU and the US are not on the same page on what can be considered as capital, the rules on liquidity, the liquidity coverage ratio (liquid assets that cover the 30 days net cash flow) which has not been finalized in the EU and the leverage ratio (ratio of core Tier 1 capital to bank assets both on and off the balance sheet). According to Klaus Deutsch (2014, 1), "Interests, institutions and ideas are the main causes of this divergence." This, together with the lack of coordination on the role of credit rating agencies after the financial crisis, leaves room for undesirable risk-taking. A number of analysts and scholars have brought attention to the failure of the EU and US to coordinate their OTC regulatory frameworks. This remains an important issue that will require the focused attention of policy makers in the coming years. However, an issue that is often overlooked is the importance of non-financial operators and their exemption from OTC regulatory reforms.

CONTINUING GAPS IN POST-CRISIS REFORMS: NON-FINANCIAL OPERATORS

Despite the immense progress made in improving the transparency and resilience of OTC derivative markets, there remain numerous gaps yet to be addressed by the G20 and the FSB. The focus of the majority of observers and scholars has been on the inconsistent implementation of financial standards for OTC derivative reform after the crisis. Although this continues to be a critical issue,

as confirmed by G20 leaders in Brisbane, Australia, in November 2014,[3] a still under-analyzed gap in post-crisis reforms is the regulatory issues arising from non-financial operators and their exemption from OTC derivatives reforms. The trading of OTC derivatives products by non-financial operators accounted for 12 percent of the total global OTC market in 2014 (BIS 2014a), a size that recalls that of subprime mortgages in 2007. The BIS analyzed the incentives to centrally clear OTC derivatives contracts under the new regulatory system and, with respect to non-financial operators, stated that "if an end user of OTC derivatives is not subject to capital requirements for counterparty credit risk, its incentive for central clearing is reduced; if the end user is not subject to the margin requirement on non-centrally cleared derivatives, or that fall below the margin required thresholds, the impact on incentives to clear centrally is not straightforward" (BIS 2014c, 19).

So far, non-financial operators' trading has been exempt from the new regulatory framework because of the relatively small size and supposed simplistic nature of their products, but the deep interconnections in the financial system can create the conditions for a domino effect, altering global financial stability. Non-financial operators include sovereigns, local administration, municipalities and non-financial firms. Sovereigns should be under scrutiny by credit rating agencies that assess creditworthiness. However, the recent financial crisis already illustrated the limits of credit rating agencies, and the small degree of coordination among countries in case of unexpected financial shocks. Several local administrations have a certain degree of freedom to engage in sophisticated financial products such as OTC derivatives — activities that should be monitored by the central state. Non-financial firms listed (such as on a stock exchange) or otherwise are monitored by domestic market authorities (for example, the antitrust authority or the Securities and Exchange Commission) and by the industry authority (for example, the authority of public utilities firms in Europe). However, their financial trading is under neither intense monitoring nor scrutiny.

RISKS POSED BY NON-FINANCIAL OPERATORS: SOVEREIGNS AND MUNICIPALITIES

After 1990, many sovereign states used OTC financial derivatives to hedge their debts and smooth costs with little disclosure of data. The size of sovereigns' trading of OTC contracts has not been small in absolute terms over the recent decades. The successful experience with OTC derivatives of US states (such as California or Texas), Denmark and Brazil (Oldani 2008) confirm that OTC derivatives contracts are potentially powerful risk management tools (although the small disclosure of data on such contracts fuelled criticism). However, as a result of the financial and Greek crises, sovereign states are no longer considered to be risk free. In fact, the European Commission discovered that Greece artificially improved its accounting figures by means of a complex portfolio of OTC interest rate and foreign exchange swaps to enter the final phase of the European Monetary Union[4]; in 2008-2009, the complex financial structure held by the Hellenic Republic generated substantial losses that added to the economic crisis. In 2010, the International Monetary Fund (IMF), EU and ECB rescued Greece by issuing direct financing and avoiding any contact with the financial market. On the market side, the credit default contracts on Hellenic sovereign bonds did not pay in full, since the "credit event" did not take place on the market. In fact, creditors voluntarily agreed to write down 50 percent of the value of their bonds (a haircut) in exchange for structural reforms, but this altered the functioning of the financial system.

Irrespective of the G20 financial regulatory improvements and the Greek crisis, in 2014 no sovereign state disclosed its trading in the OTC market, either on its balance sheet or in the budget law. For the reasons mentioned above, the lack of information on sovereign trading of OTC derivatives and associated risks must be resolved soon.

The empirical investigations available in the literature do not provide any evidence that can be generalized; the dimension and complexity of OTC derivatives by local administrations and municipalities depend on their financial independence from the central state. In the United Kingdom (where the government is ultimately responsible for all obligations underwritten by local administrations), the use of derivatives by local administrations was prohibited in 1998. In contrast, Italian regions have outstanding OTC derivatives (worth €8.735 million in 2014) that are not subject to any clearly defined domestic regulatory framework.[5] Proprietary data on French local governments (Perignon and Vallee 2013) is an illustration

3 The G20 Leaders' (2014) final communiqué stated that "critical work remains to build a stronger, more resilient financial system; the task now is to finalize remaining elements of the policy framework and fully implement the agreed financial regulatory reforms, while remaining alert to new risks. We call on regulatory authorities to make further concrete progress in swiftly implementing the agreed G20 derivatives reforms."

4 Greece used special purpose vehicles to shift part of the sovereign debt out the state balance sheet. This was discovered in 2008 when Titlos, a special purpose vehicle owned by the Treasury, asked for €5.1 billion funding at the European Central Bank (ECB) to finance the deficit. See www.marketwatch.com/story/greek-bondholders-to-take-50-haircut-2011-10-26 for more information.

5 The outstanding debt of Italian local administrations in 2013 was €115 trillion (seven percent of GDP). The Italian public debt reached 132 percent of GDP in 2013 and the republic has underwritten swaps to hedge the foreign denominate debt (less than three percent of total debt in June 2014).

Table 1: Derivatives of Italian Local Public Administrations with Italian Banks (in € million)

	Negative market value (1)							
	Dec. 07	**Dec. 08**	**Dec. 09**	**Dec. 10**	**Dec. 11**	**Dec. 12**	**Jun. 13**	**Dec. 13**
Piedmont	112	216	190	257	387	499	443	287
Valle d'Aosta	-	-	-	-	-	-	-	-
Lombardy	88	100	98	93	77	85	75	51
Trentino Alto Adige	5	-	-	-	6	10	4	4
Veneto	34	67	60	64	94	116	93	58
Friuli-Venetia Giulia	9	5	8	7	5	3	1	-
Liguria	5	9	12	11	10	10	8	5
Emilia-Romagna	24	65	56	61	82	96	77	51
Tuscany	42	48	52	55	85	107	89	54
Umbria	35	26	25	25	27	27	27	20
Marche	18	13	14	12	12	12	9	6
Lazio	70	129	141	179	124	152	123	89
Abruzzi	28	46	30	45	56	82	71	46
Molise	2	19	12	16	29	38	28	19
Campania	195	207	215	175	190	189	168	128
Apulia	84	19	17	8	5	2	2	1
Basilicata	5	9	10	11	13	13	12	7
Calabria	61	55	53	44	34	34	33	26
Sicily	74	74	86	92	98	109	97	69
Sardinia	13	8	8	6	4	3	4	3
Total negative MtM	**902**	**1.116**	**1.089**	**1.16**	**1.338**	**1.589**	**1.364**	**922**
as % of debt	0,8	1,0	0,9	1,0	1,1	1,4	1,2	0.9
Positive MtM (2)	**120**	**89**	**99**	**103**	**186**	**182**	**96**	**62**
Notional value	**31.520**	**26.963**	**23.403**	**18.542**	**13.475**	**11.283**	**10.784**	**8.735**
Number of local administrations	**671**	**474**	**484**	**309**	**234**	**177**	**178**	**n.a.**
of which:								
Negative MtM of regions	**113**	**410**	**384**	**449**	**651**	**810**	**701**	**472**
as % of debt	0,3	0,4	0,3	0,4	0,6	0,7	0,6	0.4
Number of regions	11	13	13	12	12	12	12	11
Negative MtM of province	93	123	118	130	150	184	158	106
as % of debt	1,1	0,1	0,1	0,1	0,1	0,2	0,1	0.1
Num. di Province	31	33	29	29	26	25	23	21
Negative MtM of cities	693	570	569	563	498	541	469	319
as % of debt	1,5	0,5	0,5	0,5	0,4	0,5	0,4	0.3
Number of cities	621	414	429	256	184	128	131	128
Negative MtM of other admninistrations	4	13	17	19	39	54	36	25
as % of debt	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0
Number of other administrations	8	14	13	12	12	12	12	12

Source: Banca D'Italia (2014).

of how politicians strategically use derivatives (toxic loans[6]) to increase the chance of being re-elected, especially in cases of highly indebted local administrations. In the recent past, some public administrations were bankrupted because of financial mismanagement involving derivatives contracts. The US$2 billion Orange County (California) default in 1994 and the US$4 billion default of Jefferson County (Alabama) in 2011 were, in fact, caused by excessive financial risks (Howell-Moroney and Hall 2011) and not by reduced resources available, such as taxes or government funding.[7]

6 A loan is toxic when its coupon is several times higher than the rate of a plain vanilla loan, and allows local governments to hide significant fractions of their debt.

7 Detroit is an example of default due to overfinancing with reduced resources, decreasing population and production. Unbalanced interest rate swaps produced further damage and the city paid large fees to banks to foreclose some of them.

REGULATORY ISSUES ARISING FROM NON-FINANCIAL OPERATORS AND THE OTC DERIVATIVES MARKET

There are two regulatory gaps in the regulation of OTC derivatives and their use by non-financial operators under existing reforms that need to be addressed by the G20: accounting and model risk. Lack of effective and coordinated accounting measures for OTC derivative use by non-financial operators increases the opacity of the risks that these financial products pose, creating a potential source of systemic risk in the future.

RISKS POSED BY GAPS IN ACCOUNTING STANDARDS FOR NON-FINANCIAL OPERATORS' USE OF OTC DERIVATIVES

The public accounting system is not homogeneous throughout the world, and deals with financial securities with a certain difficulty. The US Governmental Accounting Standards Board (GASB) issued Statement No. 53 in 2008 that "addresses the recognition, measurement and disclosure of information regarding derivatives entered into by state and local governments" (GASB 2008). The aim of the statement was to "improve financial reporting by requiring public administrations to measure derivatives at fair value in their economics resources measurement" (ibid.). This was probably the first attempt to deal with OTC contracts traded by the public sector.

According to the statement, if derivatives qualify for hedge accounting,[8] fair value changes are deferred until termination events specified in the standard are met. Public institutions can use hedge accounting when the derivative instrument effectively reduces the intended risk. There is a requirement to assess the hedge's effectiveness using methods prescribed in the standard. If the derivative does not satisfy the hedging criteria, any change in its fair value is reported in the investment's revenues in the current period.

The statement establishes disclosure requirements such as a derivatives summary, information about hedge effectiveness, fair value, management's objectives, significant terms and risks. The standard has been effective since fiscal year 2010, but not all countries decided to update their domestic accounting systems to conform to that of the United States in order to provide meaningful and homogeneous information on financial transactions (Italy lies far behind others in this regard).

Regardless of the introduction of international standards, the limited availability of data on use of derivatives by local administrations constitutes a barrier toward a full comprehension of the issue and of risks involved. There is evidence that the use of financial oversight committees is effective in improving financial accountability of local governments (Matkin 2010). However, it is a domestic monitoring solution that is difficult to implement widely, and success depends highly on the accountability of local administrations themselves.

Non-financial firms trade OTC products to both hedge and speculate. While financial firms must also comply with capital and margin requirements, non-financial ones are free to engage in potentially risky contracts without any requirement and under little supervision. The supposed simplistic nature of OTC contracts traded by non-financial operators is not confirmed in their accounting data and the literature. According to Per Alkeback and Nicals Hagelin (1999): 52 percent of Swedish non-financial firms used derivatives, compared with 39 percent of American and 53 percent of those in New Zealand; derivatives trading was more common among larger firms, and their purpose was basically hedging, although the lack of knowledge of this activity within the firm was a source of concern for non-US managers; and non-financial firms traded all types of OTC contracts (forwards, futures, swaps and options), written on a variety of underlyings (such as foreign exchange, interest rate, equity and commodity). However, the lack of accounting data on OTC contracts separate from other hedging contracts (such as insurance) represents a barrier toward a comprehensive assessment of risks involved. Most empirical investigations look at the hedging activity of non-financial firms. Sohnke Bartram, Gregory W. Brown and Jennifer Conrad (2011) considered a large sample of non-financial firms from 47 countries in the period between 1998 and 2004 to examine the effects of derivatives on firm risk and value. The study confirmed the expectation that derivatives reduce risk, but could not provide strong evidence of the effects on firms' values due to the low quality of derivatives data available at that time.

In July 2014, the International Financial Reporting Standards (IFRS) issued standard 9, which will replace the International Accounting Standard (IAS) statement 39, on the use of OTC derivatives by financial and non-financial firms after 2018. The IFRS introduces fair value measures to derivatives exposure, and requires firms to provide information on the type of derivatives, scope and relations with the core business. The evolving financial system structure and increased complexity led to this new comprehensive standard. According to the IFRS standard, a hedge instrument is not only a derivative, but can be the product of various securities that aim at hedging a certain business risk. There is a transition period between IAS 39 and IFRS 9, but the scope of the new standard is to provide firms with a substantially modified and easier

8 Hedge accounting considers the entries for the ownership of a security and the opposing hedge as one. Hedge accounting attempts to reduce the volatility created by the repeated adjustment of a financial instrument's value, known as marking to market. By combining the instrument and the hedge as one entry, which offsets the opposing movements, the volatility is reduced.

model for hedge accounting. The IFRS (2014) states that "[t]he new model represents a substantial overhaul of hedge accounting that aligns the accounting treatment with risk management activities, enabling entities to better reflect these activities in their financial statements. In addition, as a result of these changes, users of the financial statements will be provided with better information about risk management and the effect of hedge accounting on the financial statements."

Only after 2018 will non-financial firms' balance sheets describe their trading of financial products and derivatives and provide relevant information on risks.

RISKS POSED BY MODEL RISK

Uncertainty over the pricing of derivatives is referred to as model risk. In 1997, the Nobel Prize in Economics was awarded to Robert C. Merton and Myron S. Scholes for their contribution to the pricing of financial derivatives. In 1997-1998 the hedge fund they managed, Long-Term Capital Management L.P. (LTCM), was hit first by the Asian crisis and then the Russian bonds crisis, before crashing. The New York Federal Reserve Bank (Fed) arranged the bailout of LTCM by its creditors to avoid a systemic collapse. All banks and financial institutions involved suffered substantial losses. The option pricing model by Merton and Scholes contributed to the boom in financial trading; the collapse of LTCM was due to the complex risk models employed and, most of all, to the overreliance on these models. Many economists and market players believe that derivatives pricing models were used wrongly prior to the subprime crisis and continue to be used wrongly today (Jarrow 2010). In 1996, Emanuel Derman introduced six simple rules of thumb to mitigate model risk, but they can be succinctly summarized by one: prefer simple models to complex ones, as the devil is in the details (Derman 1996).

This paper does not discuss which pricing model fits best (such as equity or probability pricing), but it does consider how the value of derivatives and their pricing models are evaluated by board members of non-financial firms and managers of local public administrations. It is a corporate governance issue rather than a purely financial or accounting one. Corporate governance models for non-financial operators do not always require a financial risk manager that reports to the CEO (i.e., a risk governance unit that is independent from the CFO), an approach which is not suitable for handling unexpected financial risks.

Regulation and enforcement are as important as information disclosure. The new regulatory framework has enhanced information on financial transactions, but how do board members in the energy or automobile industries, for example, handle it? These two industries trade actively in the derivatives markets, both exchange and OTC, but their board members are not compelled to have any competence in finance theory and financial risk management. Enron would be an easy and effective example for the reader to see the potential risks involved in derivatives trading. Most often, however, firms follow Warren Buffett's approach: he stated in his 2002 shareholder's letter that derivatives are financial weapons of mass destruction. Looking at Berkshire Hathaway's balance sheet, however, it is clear that Buffett actively uses them, taken with a grain of salt. Nevertheless, the exact size of the grain is not easy to identify. The uncertainty over the pricing of derivatives can negatively influence market expectations and prices, and can thus diminish the effectiveness of prudential supervision.

LESSONS FROM CANADA

Canada experienced the shortest downturn among the G7; the strong economic relationship with the United States and the deep financial interconnections did not alter Canada's growth path post-2007. The combination of prudent fiscal policy and well-designed monetary policy set a sound foundation for financial stability, while robust regulation supported a resilient financial system. The high degree of concentration in the Canadian banking industry and the limited presence of foreign banks rendered the system quite unique from other systems throughout the Atlantic. In fact, the financial globalization, the deep interconnectedness, and the role of global reserve currencies in the United States and the Economic and Monetary Union are what made these economic and financial systems different from Canada's. However, Canada has certain strengths that should be replicated abroad: it enjoys the beneficial effects of a low level of public debt, liberalized markets, spending cuts, decentralized power, fiscal competition among provinces and reduced bureaucracy (such as the Red Tape Reduction Action Plan). The effective coordinated supervision of the banking and financial industries, the moral suasion policy makers employ over financial operators, and the clear responsibility and accountability of authorities contribute to Canada's favourable global position.

Table 2: OTC Derivatives (in US$ billion)

	Jun. 2010	Dec. 2010	Jun. 2011	Dec. 2011	Jun. 2012	Dec. 2012	Jun. 2013	Dec. 2013	Jun. 2014
Notional amounts outstanding	582.685	601.046	706.884	647.811	641.309	635.685	696.408	710.633	691.492
Gross market values	24.697	21.296	19.518	27.297	25.519	24.953	20.245	18.825	17.423

Source: BIS (2014d).

Table 3: Amounts Outstanding of OTC Derivatives (by risk category and instrument in US$ billion)

Notional amounts outstanding														
	Dec.07	Jun.08	Dec.08	Jun.09	Dec.09	Jun.10	Dec.10	Jun.11	Dec.11	Jun.12	Dec.12	Jun.13	Dec.13	Jun. 14
Total contracts	585.932	672.558	598.147	594.553	603.900	582.685	601.046	706.884	647.811	639.395	632.582	692.924	710.182	691.492
Foreign exchange contracts	56.238	62.983	50.042	48.732	49.181	53.153	57.796	64.698	63.381	66.672	67.358	73.121	70.553	74.782
Forwards and forex swaps	29.144	31.966	24.494	23.105	23.129	25.624	28.433	31.113	30.526	31.395	31.718	34.421	33.218	35.190
Currency swaps	14.347	16.307	14.941	15.072	16.509	16.360	19.271	22.228	22.791	24.156	25.420	24.654	25.448	26.141
Options	12.748	14.710	10.608	10.555	9.543	11.170	10.092	11.358	10.065	11.122	10.220	14.046	11.886	13.451
Interest rate contracts	393.138	458.304	432.657	437.228	449.875	451.831	465.260	553.240	504.117	494.427	489.706	561.314	584.364	563.290
Forward rate agreements	26.599	39.370	41.561	46.812	51.779	56.242	51.587	55.747	50.596	64.711	71.353	86.334	73.819	92.575
Interest rate swaps	309.588	356.772	341.128	341.903	349.288	347.508	364.377	441.201	402.611	379.401	370.002	425.584	461.281	412.273
Options	56.951	62.162	49.968	48.513	48.808	48.081	49.295	56.291	50.911	50.314	48.351	49.396	49.264	49.442
Equity-linked contracts	8.469	10.177	6.471	6.584	5.937	6.260	5.635	6.841	5.982	6.313	6.251	6.821	6.560	6.941
Forwards and swaps	2.233	2.657	1.627	1.678	1.652	1.754	1.828	2.029	1.738	1.880	2.045	2.321	2.277	2.433
Options	6.236	7.521	4.844	4.906	4.285	4.506	3.807	4.813	4.244	4.434	4.207	4.501	4.283	4.508
Commodity contracts	8.455	13.229	4.427	3.619	2.944	2.852	2.922	3.197	3.091	2.994	2.587	2.458	2.206	2.206
Gold	0.595	649.147	0.395	0.425	0.423	0.417	0.397	0.468	0.521	0.523	0.486	0.461	0.341	0.319
Other commodities	7.861	12.580	4.032	3.194	2.521	2.434	2.525	2.729	2.570	2.471	2.101	1.997	1.865	1.887
Forwards and swaps	5.085	7.561	2.471	1.715	1.675	1.551	1.781	1.846	1.745	1.659	1.363	1.327	1.261	1.283
Options	2.776	5.019	1.561	1.479	0.846	0.883	0.744	0.883	0.824	0.812	0.739	0.670	0.603	0.604
Credit default swaps	58.244	57.403	41.883	36.098	32.693	30.261	29.898	32.409	28.626	26.930	25.068	24349	21.020	19.462
Single-name instruments	32.486	33.412	25.740	24.165	21.917	18.494	18.145	18.121	16.865	15.566	14.309	13.135	11.324	10.845
Multi-name instruments	25.757	23.991	16.143	11.933	10.776	11.767	11.753	14.288	11.761	11.364	10.760	11.214	9.696	8.617
...of which index products	...	...	...	0	...	7.500	7.476	12.473	10.06	9.723	9.656	10.163	8.746	7.939
Unallocated	61.387	70.463	62.667	62.291	63.270	38.329	39.536	46.498	42.612	42.059	41.611	24.861	25.480	24.810

Gross market values														
	Dec.07	Jun.08	Dec.08	Jun.09	Dec.09	Jun.10	Dec.10	Jun.11	Dec.11	Jun.12	Dec.12	Jun.13	Dec.13	Jun. 14
Total contracts	15.802	20.340	35.281	25.298	21.542	24.697	21.298	19.510	27.297	25.408	24.733	20.082	18.658	17.423
Foreign exchange contracts	1.807	2.262	4.084	2.470	2.070	2.544	2.482	2.336	2.592	2.249	2.313	2.427	2.284	1.722
Forwards and forex swaps	0.675	0.802	1.830	0.870	0.683	0.930	0.886	0.777	0.923	0.773	0.806	0.957	0.824	0.571
Currency swaps	0.817	1.071	1.633	1.211	1.043	1.201	1.235	1.227	1.324	1.190	1.259	1.131	1.186	0.939
Options	0.315	0.388	0.621	0.389	0.344	0.413	0.362	0.332	0.345	0.286	0.249	0.339	0.273	0.213
Interest rate contracts	71.77	92.63	20.87	15.478	14.020	17.533	14.746	13.244	20.001	19.113	18.833	15.081	14.39	13.461
Forward rate agreements	0.041	0.088	0.165	0.130	0.080	0.081	0.206	0.059	0.067	0.051	0.047	0.168	0.108	0.126
Interest rate swaps	6.183	8.056	18.158	13.934	12.576	15.951	13.139	11.861	18.046	17.214	17.080	13.588	12.758	12.042
Options	0.953	1.120	1.764	1.414	1.364	1.501	1.401	1.324	1.888	1.848	1.706	1.325	1.174	1.292
Equity-linked contracts	1.142	1.146	1.112	0.879	0.708	0.706	0.648	0.702	0.673	0.639	0.600	0.692	0.700	0.666
Forwards and swaps	0.239	0.283	0.335	0.225	0.176	0.189	0.167	0.176	0.156	0.147	0.157	0.206	0.202	0.191
Options	0.903	0.863	0.777	0.654	0.532	0.518	0.480	0.526	0.518	0.492	0.443	0.486	0.498	0.475
Commodity contracts	1.898	2.213	0.955	0.682	0.545	0.458	0.526	0.470	0.466	0.379	0.347	0.384	0.264	0.269
Gold	0.070	0.072	0.065	0.043	0.048	0.045	0.047	0.050	0.063	0.051	0.042	0.080	0.047	0.032
Other commodities	1.829	2.141	0.890	0.638	0.497	0.413	0.479	0.420	0.403	0.328	0.304	0.304	0.217	0.237
Credit default swaps	2.020	3.192	5.116	2.973	1.801	1.666	1.352	1.345	1.586	1.187	0.848	0.725	0.653	0.635
Single-name instruments	1.158	1.901	32.63	1.950	1.243	0.993	0.886	0.854	0.958	0.715	0.527	0.430	0.369	0.368
Multi-name instruments	0.862	1.291	1.854	1.023	0.558	0.673	0.467	0.490	0.628	0.472	0.321	0.295	0.284	0.266
Unallocated	1.759	2.264	3.927	2.816	2.398	1.789	1.543	1.414	1.978	1.841	1.792	0.772	0.718	0.670
Gross credit exposure	3.256	3.859	5.005	3.744	3.521	3.581	3.480	2.971	3.938	3.691	3.609	3.784	3.033	2.842

Source: BIS (2014d).

Table 4: Amounts Outstanding of OTC Foreign Exchange Derivatives (by instrument and counterparty in US$ billion)

Notional amounts outstanding														
	Dec.07	Jun.08	Dec.08	Jun.09	Dec.09	Jun.10	Dec.10	Jun.11	Dec.11	Jun.12	Dec.12	Jun.13	Dec.13	Jun.14
Total contracts	56.238	62.983	50.042	48.732	49.181	53.153	57.796	64.698	63.381	66.672	67.358	73.121	70.553	74.782
Reporting dealers	21.334	24.845	19.665	18.849	18.896	19.924	21.956	26.170	27.953	29.484	28.834	30.690	31.206	31.971
Other financial institutions	24.357	26.775	21.300	21.441	21.445	23.476	25.636	28.854	25.916	27.538	28.831	31.757	30.552	33.700
Non-financial customers	10.548	11.362	9.077	8.442	8.840	9.753	10.204	9.675	9.512	9.651	9.693	10.674	8.794	9.111
Outright forwards and foreign exchange swaps	29.144	31.966	24.494	23.105	23.129	25.624	28.433	31.113	30.526	31.395	31.718	34.421	33.218	35.190
Reporting dealers	9.899	10.897	8.472	7.701	7.683	8.370	9.262	10.932	11.319	11.576	11.083	11.846	11.647	11.931
Other financial institutions	13.102	14.444	10.906	10.653	10.497	11.878	13.018	14.529	13.386	14.023	14.860	16.441	16.506	18.245
Non-financial customers	6.143	6.624	5.116	4.751	4.949	5.376	6.153	5.651	5.820	5.796	5.775	6.134	5.066	5.014
Currency swaps	14.347	16.307	14.941	15.072	16.509	16.360	19.271	22.228	22.791	24.156	25.420	24.654	25.448	26.141
Reporting dealers	5.487	6.599	6.009	6.330	7.112	7.027	8.320	10.075	11.819	12.698	12.895	12.443	13.720	13.889
Other financial institutions	6.625	7.367	6.858	6.717	7.282	7274	8.802	9.749	8.613	9.086	9.809	9.681	9.025	9.463
Non-financial customers	2.234	2.341	2.074	2.025	2.115	2.059	2.149	2.404	2.359	2.372	2.716	2.530	2.703	2.789
Options	12.748	14.710	10.608	10.555	9.543	11.170	10.092	11.358	10.065	11.122	10.220	14.046	11.886	13.451
Reporting dealers	5.948	7.349	5.184	4.818	4.101	4.528	4.373	5.163	4.815	5.211	4.856	6.401	5.840	6.151
Other financial institutions	4.629	4.964	3.537	4.071	3.666	4.324	3.816	4.575	3.917	4.429	4.162	5.635	5.022	5.992
Non-financial customers	2.171	2.397	1.887	1.666	1.775	2.318	1.902	1.619	1.333	1.482	1.203	2.010	1.025	1.308
Gross market values														
	Dec.07	Jun.08	Dec.08	Jun.09	Dec.09	Jun.10	Dec.10	Jun.11	Dec.11	Jun.12	Dec.12	Jun.13	Dec.13	Jun.14
Total contracts	1.807	2.262	4.084	2.470	2.070	2.544	2.482	2.336	2.592	2.249	2.313	2.427	2.284	1.722
Reporting dealers	0.594	0.782	1.520	0.892	0.732	0.890	0.899	0.875	1.047	0.881	0.946	0.992	1.011	0.709
Other financial institutions	0.806	0.995	1.768	1.066	0.888	1.100	1.050	0.973	0.991	0.885	0.911	0.999	0.887	0.693
Non-financial customers	0.407	0.484	0.796	0.512	0.449	0.554	0.534	0.489	0.555	0.483	0.456	0.437	0.386	0.321
Outright forwards and foreign exchange swaps	0.675	0.802	1.830	0.870	0.683	0.930	0.886	0.777	0.923	0.773	0.806	0.957	0.824	0.571
Reporting dealers	0.228	0.281	0.662	0.301	0.235	0.315	0.326	0.318	0.354	0.282	0.295	0.360	0.325	0.209
Other financial institutions	0.292	0.348	0.780	0.374	0.300	0.400	0.365	0.302	0.385	0.337	0.351	0.421	0.359	0.263
Non-financial customers	0.154	0.172	0.388	0.195	0.148	0.215	0.194	0.157	0.184	0.153	0.160	0.175	0.140	0.099
Currency swaps	0.817	1.071	1.633	1.211	1.043	1.201	1.235	1.227	1.324	1.190	1.259	1.131	1.186	0.939
Reporting dealers	0.215	0.315	0.568	0.402	0.332	0.388	0.390	0.387	0.523	0.463	0.529	0.464	0.543	0.394
Other financial institutions	0.406	0.520	0.783	0.568	0.478	0.561	0.586	0.576	0.520	0.472	0.488	0.462	0.432	0.352
Non-financial customers	0.196	0.237	0.282	0.241	0.233	0.252	0.258	0.264	0.281	0.255	0.241	0.205	0.211	0.193
Options	0.315	0.388	0.621	0.389	0.344	0.413	0.362	0.332	0.345	0.286	0.249	0.339	0.273	0.213
Reporting dealers	0.151	0.186	0.290	0.190	0.166	0.186	0.182	0.170	0.170	0.135	0.123	0.167	0.143	0.106
Other financial institutions	0.108	0.127	0.205	0.125	0.111	0.139	0.098	0.095	0.086	0.076	0.071	00116	0.096	0.077
Non-financial customers	0.057	0.075	0.126	0.075	0.068	0.088	0.081	0.067	0.090	0.075	0.055	0.056	0.035	0.029

Source: BIS (2014d).

The strength of Canada's financial regulation and supervision is built on the shared responsibility among the Department of Finance and other federal financial regulatory authorities, including the Bank of Canada, the Office of the Superintendent of Financial Institutions (OSFI) and the Canada Deposit Insurance Corporation (CDIC). Ultimately, the minister of finance is responsible for safeguarding the financial system and is accountable to Parliament. The Bank of Canada has also proven to be quite influential among G20 central banks, and its diplomacy consolidates the national position in the G20 (Lombardi and Siklos, 2014).

Table 5: Structure of the Canadian Financial Regulatory and Supervisory System

Institution	Core Function
OSFI	The prudential regulator of Canadian banks and other federally regulated financial institutions; responsible for implementing Basel Committee principles and guidance in the country.
Bank of Canada	Central bank responsible for setting monetary policy and promoting a stable and efficient financial system.
Department of Finance	Responsible for the legislative framework governing banks and other federally regulated financial institutions.
Financial Institutions Supervisory Committee (FISC)	A committee of senior government representatives who meet regularly to share information and advise the federal government on financial system issues. FISC members are from OSFI (Chair), the Department of Finance, Bank of Canada, CDIC and the Financial Consumer Agency of Canada.
CDIC	CDIC is a federal Crown corporation created by Parliament in 1967 to protect bank deposits at member financial institutions in case of bankrupt. CDIC insures deposits of up to CDN$100,000.

Source: Canadian Bankers Association (2014).

The conditions for a stable growth path are guaranteed by the fact that Canada has not engaged in a race to the bottom in the regulatory standards following the financial crisis. After the worst of the crisis, David Dodge (2010), after his term as the governor of the Bank of Canada ended, advocated for eight main improvements to Canadian and even the international monetary and financial policies:

1. monetary policy should continue pursuing price and financial stability;
2. since inflation targeting and stabilizing growth policies have proven successful, they will be pursued in the future;
3. wider analysis of systemic risks and liquidity, providing it should be developed by the central bank following the evolution of the financial system;
4. countercyclical and reserve capital should be introduced for banks;
5. margin requirements for derivatives and different loan-to-value rules for mortgage insurance should be enforced;
6. information on trading and settlements, especially for OTC products, is necessary;
7. risk management models should consider plausible scenarios; and
8. cooperation and coordination in the financial system should improve at the global level.

By 2014, all of the above had been implemented by Canada. Additionally, the Bank of Canada has updated its actions and policies in compliance with the first three recommendations. Canada's banking system is already compliant with the Basel III standards — Dodge's third, fourth, fifth and seventh recommendations (BIS 2014b) — and trade repositories for OTC contracts involving Canadian counterparts have started reporting in the fall of 2014 (recommendations 5, 6, 7 and 8).

The Canadian system's weaknesses are currently represented by the misalignment between federal and provincial financial regulation and control, trade restrictions across different provinces, high household debt and relevant government exposure to mortgage insurance (Bank of Canada 2014). The strengths of the Canadian OTC derivatives market lies in its concentrated structure and effective monitoring. Regardless of the fact that most contracts with a Canadian counterpart are traded in the US market, the Bank of Canada actively monitors them. Over 70 percent of OTC contracts are traded by the big six Canadian banks, and the high concentration further simplifies the monitoring process. The Government of Canada does not engage in OTC products to hedge its debt, and local authorities are persuaded not to do so. However, if they were to engage in such actions, based on the accounting rules, complete information would be required in terms of risks, counterparts, hedging strategy and liquidity. One-third of non-financial publicly listed firms engage in derivatives trading for hedging purposes, and these firms are "larger, mature and enjoy lower earnings volatility than those that do not use derivatives" (Paligorova and Staskow 2014, 47). In terms of balance sheet management, more sophisticated firms engage in derivatives trading, especially during periods of greater uncertainty (such as 2008–2010), which positively affected earnings' volatility. The provincial authorities monitor their trading, and the deep monitoring and supervision of their banking counterparts limit the systemic risks.

The structure of the Canadian OTC derivatives market is solid, but given its relatively small global size, it could be damaged by an unexpected crisis originating, for example, in a sovereign debt restructuring process of a highly indebted country or from excessive volatility in the price of oil and related derivatives contracts.

CONCLUSION

The G20 addressed the role of OTC derivatives and, although moving in the right direction, the global regulatory reforms lack transatlantic coordination and do not explicitly consider the trading of non-financial operators under the new regulatory framework. The trading of OTC derivatives by non-financial operators does not often take place under the new regulatory umbrella, either because of the relative size of the institution (i.e., below the minimum threshold), the lack of capital requirements or the absence of proper accounting rules. This, together with the uncertainty on the pricing of derivatives, lowers the incentives to centrally clear OTC contracts, increases counterparty risks and, finally, undermines financial stability. The transatlantic inconsistency leaves room for regulatory arbitrage, reducing the potential benefits of the reform itself, and damaging the global recovery process. The G20 should impose greater regulatory coordination between the European Union and the United States to effectively achieve growth and stability.

Among G20 countries, Canada's regulatory approach toward financial and non-financial operators and OTC derivatives trading has proven successful in effectively limiting moral hazard and reducing the side effects of the global financial crisis. In order to strengthen the structure and resilience of the international financial system, the G20 should turn its attention to the role non-financial operators play in trading OTC products, and reconsider the appropriate regulatory framework for these market actors.

The G20, under the 2015 Turkish presidency, should seek to promote transparency in the trading of OTC derivatives of sovereigns, local governments and other non-financial operators by adopting accounting criteria able to provide information on off-balance sheet assets and liabilities, and eventually adhering to the centralized counterparty system and the collateralized system of trading.

Domestic market authorities overlook non-financial firms that are either listed on a stock exchange or not — their financial trading is monitored and scrutinized through auditing requirements. However, it should be developed under stronger corporate governance rules since the uncertainty over the pricing of derivatives negatively influence market expectations and prices, and can thus diminish the effectiveness of prudential supervision.

Non-financial operators should be compelled to adhere to the centralized counterparty system and the collateralized systems of trading, and to enhance their accounting and risk management procedures in order to effectively deal with financial and systemic risks.

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APPENDIX: THE EUROPEAN REGULATORY FRAMEWORK

In October 2008, European Commission President José M. Barroso established a high-level working group to advise on the future of European regulation and supervision, under the guidance of Jacques de Larosière, former chairman of the Banque de France. The results of the high-level working group formed the basis of the regulatory and supervisory improvements in the European Union introduced after 2009. It sought to create a framework for establishing a new regulatory agenda, stronger and coordinated supervision, and to introduce of an effective crisis risk management procedure. After the financial crisis, significant progress has been achieved in Europe in removing costly and burdensome barriers in the post-trading arena, enhancing market infrastructure resilience and promoting financial stability. The European Union has issued directives and regulations to transition the Basel III framework into the domestic systems (CRR/CRD IV), to introduce central clearing of OTC derivatives (EMIR), to improve the insurance market (Solvency II) and to improve the workings of the financial market (MiFID II/MiFIR) (see European Commission 2012; 2013; 2014a; 2014b). These directives translate into the national systems, based on the domestic rule of law.

In July 2013, the CRR/CRD IV translated the Basel III framework into the European system for financial and banking operators (European Commission 2013). This new capital system for banks will bring along improved methodologies and strongly disincentivize trading of OTC financial securities (such as derivatives) out of CCPs. The most popular criticism of Basel III is the fact that the high (some say excessive) burden of capital required for banks does not necessarily translate into greater financial stability.

The European regulation on OTC derivatives, CCPs and trade repositories — the EMIR — came into force in August 2012 (European Commission 2012). The EMIR requires

standard derivative contracts to be cleared through CCPs and establishes stringent organizational, business conduct and prudential requirements for these CCPs. It also introduces an obligation to report derivative contracts to trade repositories. The EMIR is directly applicable and enforceable throughout the European Union, which should increase financial stability and safety by preventing the situation where the collapse of one financial firm can cause a domino effect. Another important step is the adoption by the European Commission of a proposal for a regulation on improving securities settlement in the European Union and on central securities depositories.

The financial crisis hit the global insurance industry hard (for example, the American International Group), and bankruptcies have been as expensive as in the banking industry. The European Commission has been revising the European insurance system for over a decade, and Solvency II will come into force in 2016 (European Commission 2014b). The revision process aims to:

- take account of developments in insurance, risk management, finance techniques, international financial reporting and prudential standards;
- streamline the way that insurance groups are supervised and recognize the economic reality of how groups operate;
- strengthen the powers of the group supervisor, ensuring that group-wide risks are not overlooked; and
- ensure greater cooperation between supervisors; groups will be able to use group-wide models and take advantage of group diversification benefits.

The new regulatory system will probably contribute to a decrease in the degree of competition in the insurance industry, due to higher capital requirements. A popular criticism of Solvency II is its use of the value-at-risk method to price risk that applied under Basel II, which proved to be unable to detect the excessive risks undertaken by banks and financial intermediaries at the roots of the financial crisis.

In 2007, the European Union introduced the MiFID, which sets out the business conduct and organizational requirements for investment firms, authorization requirements for regulated markets, regulatory reporting to avoid market abuse, trade transparency obligation for shares, and rules on the admission of financial instruments to trading. MiFID has been a cornerstone of the EU's regulation of financial markets, and improved the competitiveness of EU financial markets by creating a single market for investment services and activities, and ensuring a high degree of harmonized protection for investors in financial instruments. It created competition between investment services and brought more choice and lower prices for investors, but "shortcomings were exposed in the wake of the financial crisis" (European Commission 2014a). In October 2011, the EU released MiFID II and MiFIR with the aim of making financial markets more efficient, resilient and transparent, and to strengthen the protection of investors (ibid.). MiFIR should fill the gaps left open in the past.

In Europe, further progress is "required to remove all the barriers linked to post-trading to create an efficient market infrastructure that ensures financial stability…. To achieve this, some key challenges remain such as CCP recovery and resolution, the Securities Law and to abolish the fiscal compliance barriers related to post-trading after the success with the Commission Recommendation in this field."[9] These measures are necessary steps to promote financial stability, enhance legal certainty and bring more efficiency in the future.

The European Commission found agreement with countries on certain financial regulatory principles in the recent past, but at present their enforcement is not going to totally eliminate the regulatory arbitrage. As Shawn Donnelly (2014, 999) says with stronger words, the "dominance of power politics ensures that European economic governance not only remains institutionally and financially un-capable of providing for financial stability, but deliberately do so."The current state of macroeconomic and political coordination between common monetary policy and the multiple fiscal policies cannot guarantee recovery and growth in the aftermath of the crisis.

9 See http://ec.europa.eu/finance/financial-markets/index_en.htm.

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CIGI MASTHEAD

67 Erb Street West
Waterloo, Ontario N2L 6C2, Canada
tel +1 519 885 2444 fax +1 519 885 5450
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