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FINANCIAL MARKET LIBERALISATION, WEALTH AND CONSUMPTION

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by Laurence Boone, Nathalie Girouard and Isabelle Wanner

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ABSTRACT/RÉSUMÉ

The past two decades have seen substantial deregulation in the financial sectors of most OECD countries. The main motivation was to improve efficiency within the financial system, but the macroeconomic implications might go beyond this objective with impacts on the business cycle and the transmission mechanisms of monetary and fiscal policies. More specifically, financial liberalisation and heightened competition in the financial services sector, through a rapid expansion of credit, may have eased the liquidity constraints facing households, thus raising the targeted level of consumption. The objective of this paper is to test whether financial deregulation, through an easing of liquidity constraints, has had an impact on the relationship between consumption and income, and more specifically on the wealth effect. A range of different procedures is used to assess the impact of financial deregulation on global wealth and on its different components (financial, housing and others). The results provide evidence of the differences in effects as between the U.S. with strong effects, European countries with more mixed impacts, and Japan, which stands distinctly apart with nearly no effects.

JEL *classification*: E21, D12, D91
Keywords: consumption, wealth, house prices, financial liberalisation

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Les vingt dernières années ont été témoin de la libéralisation du secteur financier dans la plupart des pays de l'OCDE. L'objectif premier était d'accroître l'efficacité du système financier, mais les implications macro-economiques ont sans doute été au-delà de cet objectif, affectant les fluctuations du cycle et les mécanismes de transmission des politiques monétaires et fiscales. Plus précisément, la déréglementation financière, avec une compétition accrue dans le secteur des services financier, devrait avoir relaxé les contraintes de liquidité des ménages, grâce à l'extension des crédits, et permettre ainsi un niveau de consommation plus élevé. Ce document cherche à analyser l'effet de la déréglementation financière sur la relation entre consommation et revenu, et plus particulièrement sur les effets richesse, dans les principaux pays du G7. Différentes procédures de tests sont utilisées, analysant l'impact sur la richesse globale et sur différentes catégories de richesse (financière, immobilière et autre). Les résultats montrent un effet important de la déréglementation financière aux États-Unis, plus mitigé en Europe et au Canada, et presque inexistant au Japon.

C*lassification*: E21, D12, D91
Mots-clés : consommation, richesse, prix des logements, libéralisation financière

TABLE OF CONTENTS

I. Introduction 4
II. Effect of Financial Deregulation on Wealth 4
III. Testing Methodology 7
Estimation of consumption relationships 7
Tests of financial deregulation in the existing literature 8
Proposed testing methodology 9
IV. Data and Estimation Results 10
Estimation of consumption regressions 10
Testing for financial deregulation: results 14
Testing for financial deregulation: a focus on housing equity withdrawals 15
V. Conclusion 15

ANNEX I JOHANSEN COINTEGRATION TESTS 18

ANNEX II DETAILED TEST RESULTS 21

Sub sample estimation and zero-one dummy tests 21
Net mortgages dummies 23

BIBLIOGRAPHY 25

Tables

1. Some measures of financial liberalisation for a selection of G7 countries
2. Augmented Dickey-Fuller test
3. Private consumption and net worth
4. Private consumption and different component of wealth
5. Summary table: financial deregulation tests
6. Private consumption, wealth and housing equity withdrawal: regression results

Annex tables

A1. Johansen Cointegration Tests
A2. Test for financial deregulation: estimation of coefficients by sub-sample
A3. Test for financial deregulation: estimation of coefficients with a 0-1 dummy procedure
A4. Test for financial deregulation: estimation of coefficients with net mortgage dummies

Figures

1. Total wealth decomposition

FINANCIAL MARKET LIBERALISATION, WEALTH AND CONSUMPTION

Laurence Boone, Nathalie Girouard and Isabelle Wanner[1]

I. Introduction

1. The past two decades have seen substantial deregulation in the financial sectors of most OECD countries. The main motivation was to improve efficiency within the financial system, but the macroeconomic implications might go beyond this objective with impacts on the business cycle and the transmission mechanisms of monetary and fiscal policies. More specifically, financial liberalisation and heightened competition in the financial services sector, through a rapid expansion of credit, may have eased the liquidity constraints facing households, thus raising the targeted level of consumption.

2. The objective of this paper is to test whether financial deregulation, through an easing of liquidity constraints, has had an impact on the relationship between consumption and income, and whether this effect is similar across countries. The framework is that of the permanent income hypothesis, as is usual for consumption function estimation (see Boone *et al.*, 1998). A range of different procedures is used to assess the impact of financial deregulation. The results provide evidence of the differences in effects as between the U.S. with strong effects, European countries with more mixed impacts, and Japan which stands distinctly apart with nearly no effects.

3. The paper is organised as follows. Section II outlines the theoretical underpinnings of the importance of financial liberalisation on the relationship between consumption and wealth. Section III describes an appropriate estimation method and the corresponding testing strategy for identifying such effects, drawing on the recent literature. Section IV presents the estimation results obtained across the G7 countries with the exception of Germany.[2] Section V concludes and discusses possible directions for further research.

II. Effect of Financial Deregulation on Wealth

4. Lack of empirical support for the life cycle model of consumption behaviour has often been attributed to liquidity constraints.[3] Indeed, the crucial assumption underlying the life cycle model is one of perfect capital markets, where households can borrow against their future income to finance current consumption. In practice households may face limits on their ability to borrow against future income. For

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2. Housing wealth was not available over long period for Germany.

3. See Deaton (1991) for a review of arguments for credit constraints.

instance, marketable assets are required as collateral to borrow large amounts of money, there are credit limits, and interest rates are higher on unsecured loans.

5. By preventing full intertemporal smoothing of consumption, credit constraints may lead a sizeable proportion of consumers to link consumption decisions to current disposable income flows, rather than permanent income. However, in many OECD countries, changes in the functioning of financial markets in recent decades, in particular following progressive financial deregulation since the late 1970s and reductions in borrowing constraints for consumers, have weakened liquidity arguments contributing to a reduction in the household's aggregate propensity to save.[4]

6. An important aspect of financial liberalisation in the eighties and nineties concerned interest rate deregulation and liberalisation of the "credit" market. Table 1 summarises the different steps towards financial liberalisation for some major OECD countries. Roughly speaking, the bulk of the deregulation process took place in the first half of the eighties in the United States, the United Kingdom and Canada, but later on and more gradually for France, Italy and Japan.

Table 1. **Some measures of financial liberalisation for a selection of G7 countries**

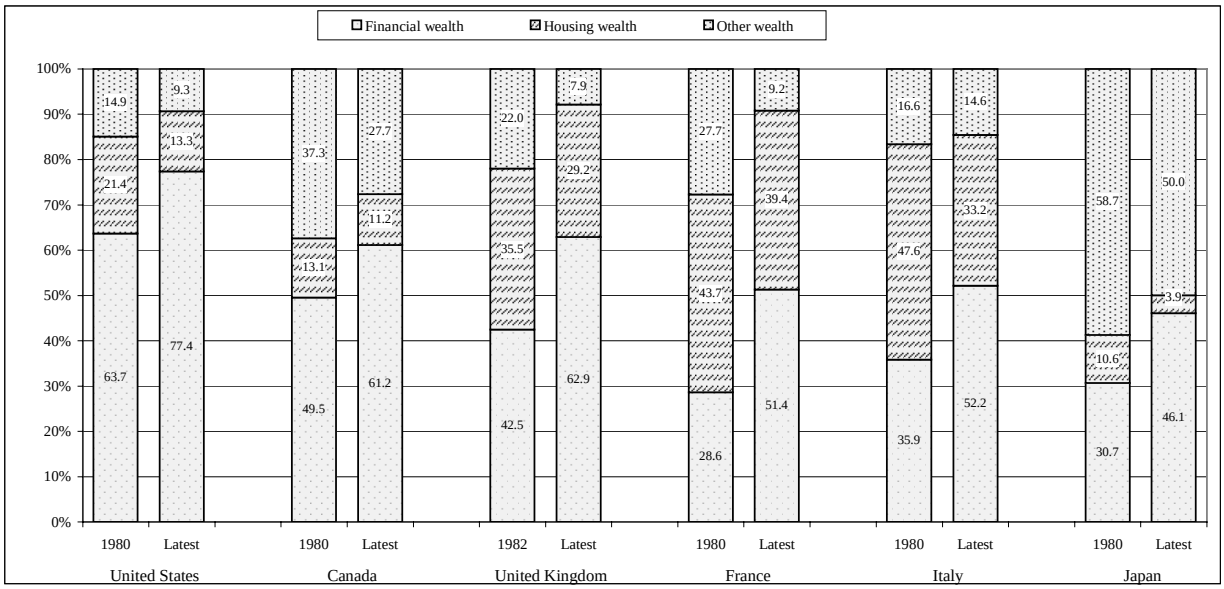
United States	Securitisation introduced in 1971 Interest rate deregulation, phasing out of Regulation Q over four years starting in 1980 Elimination of portfolio restrictions for thrifts in 1980
Japan	Bank specialisation requirements reduced in 1993 Interest rate deregulation completed in 1994
France	Bank specialisation requirements reduced in 1984 Elimination of credit controls in 1987 Securitisation introduced in 1991 Implementation of Second Banking Directive (89/646/EEC) into national law in 1992
Italy	Interest rate deregulation in 1983 Credit ceilings eliminated in 1983 and temporarily re-imposed in 1986-87 Implementation of Second Banking Directive (89/646/EEC) into national law in 1993 Separation of long-term and short-term credit institutions abolished in 1994
United Kingdom	Credit controls, "the corset", eliminated in 1980 Bank of England's minimum lending rate abolished in 1981 Banks allowed to compete with building societies for housing finance after 1981 Building societies allowed to expand their lending business after 1986 Government withdrew guidelines on mortgage lending in 1986 Securitisation introduced in 1987 Implementation of Second Banking Directive (89/646/EEC) into national law in 1993
Canada	Ceiling on interest rates on bank loans eliminated in 1967 Restrictions on the banks' involvement in mortgage financing abolished in 1967 Banks allowed to have mortgage loan subsidiaries in 1980 Securitisation introduced in 1987

1. Deposit interest rate ceilings.
Source: Williamson and Mahar (1998), Freedman (1998), Booth *et al.* (1994), Drees and Pazarbasioglu (1995), and OECD.

4. See Bayoumi (1993) and Caporal and Williams (1997) for such evidence for the United Kingdom.

7. By reducing borrowing constraints, one important effect of financial liberalisation is to trigger changes in the composition of household's wealth. While household assets were mostly made up of housing prior to financial deregulation, households' portfolios have since been re-balanced in favour of equities and other financial assets (see Figure 1). At the same time, the proportion of agents holding financial assets some of them with a higher propensity to consume has increased. In addition, due to the sharp increase in the price of equities and other financial assets in the 1990s, the relative weight of real estate has fallen. Overall, the rise in wealth as a proportion of GDP corresponds to an increase in permanent income, implying a progressive rise in the level of consumption. Furthermore, to the extent that more households have a higher propensity to consume, there could be a temporary period when the growth rate of consumption is higher.

Figure 1. **Total wealth decomposition**



Note: Financial wealth is defined as financial assets minus financial liabilities but including mortgages. Housing wealth is defined as housing assets minus home mortgages. Other wealth is defined as net worth minus financial wealth and housing wealth. It comprises for example other tangible assets such as land.

Source: OECD, Financial Accounts of OECD countries; United States, Federal Reserve, Flow of Funds Accounts of the United States, September 2000; Japan,Economic Planning agency, Annual Report on National Accounts 2000; France, INSEE, 25 ans de Comptes du Patrimoine (1969-93), and Rapport sur les Comptes de la Nation; Italy, Banca d'Italia, Supplementi al Bollettino Statistico; United Kingdom, National Accounts, Financial Statistics; Canada, National Balance Sheet Accounts.

8. Financial deregulation should also affect consumption through housing wealth effects, since it allows more households to become homeowners, and eventually to increase the amount they can borrow (on the higher value of collateral). Hence, the impact of financial liberalisation on housing wealth should be broadly similar to that on financial wealth, again enhancing the targeted level of consumption. However, the extent of this effect is likely to vary across countries, the traditional pattern of housing ownership reflecting cultural differences.[5]

5. For example, a typical Italian household will not borrow very much to buy property, yet a large proportion own their houses, while a typical Canadian household will borrow a large part of the value of the house. See Girouard and Blöndal (2000) for more details.

III. Testing Methodology

Estimation of consumption relationships

9. Estimation of the long-term level of consumption and its growth rate are based on the methodology used in Boone *et al*. (1998). Within the life-cycle permanent income theory framework, a long-run relationship between the consumption to income ratio and wealth is estimated. Wealth may be aggregated or disaggregated, as different categories of wealth may impact consumption with different magnitude (Zeldes, 1989). The corresponding consumption equations could be written more formally as:

$$cy = \alpha + \lambda(tw) + ect_{1a} \qquad (1a)$$

$$cy = \alpha + \beta(fe) + \gamma(he) + \delta(ow) + ect_{1b} \qquad (1b)$$

where *cy* is the consumption to disposable income ratio, *tw* represents total wealth, *fe* financial wealth defined as financial assets minus financial liabilities excluding mortgages, *he* housing wealth defined as housing assets minus mortgages, *ow* other wealth defined as net worth minus *fe* and *he*. All the explanatory variables are in levels, expressed in nominal terms, and as ratios to disposable income, while the dependent variable, *cy*, defined as the ratio of private consumption to disposable income is expressed in logarithmic form.[6] Disposable income embodies labour income, property income and transfer income. α is a constant, β, γ, δ and λ are long-term propensities to consume out of financial wealth, housing wealth, other wealth and total wealth respectively. ect_{1a} and ect_{1b} are the residuals from the two regressions.

10. These specifications allow the identification of a target level of consumption in terms of wealth, as well as an estimate of the propensity to consume out of each category of wealth. The long-term relationship (estimated in terms of a cointegrating vector) can then be included as an error correction term, in a dynamic equation explaining the short-term fluctuations of the consumption to income ratio. The short-run equations also include lagged differences of the long-run components, and can be enriched by taking into account:

- the interest rate to reflect substitution effects;
- the inflation rate as a proxy for uncertainty as well as the real depreciation of non-indexed financial assets;
- and fluctuations in the unemployment rate as a proxy for uncertainty surrounding the future stream of income.

6. A similar specification, relating the log of the consumption-income ratio to the un-logged wealth-income ratio has been used for instance by Muellbauer (1994). A thorough algebraic analysis on the derivation of the appropriate functional form for consumption equilibrium may be found in Rossi and Visco (1995).

11. Two specifications, one with aggregated and another with disaggregated wealth, are estimated[7]:

$$\Delta(c) = \tau ect_{1a}(-1) + \sum_{i=1}^{n}\gamma_i\Delta(c)(-i) + \sum_{i=1}^{n}\theta_i\Delta(y)(-i) + \sum_{i=0}^{n}\nu_i\Delta(tw)(-i) + \sum_{i=0}^{n}\kappa_i\Delta(unr)(-i) + \sum_{i=0}^{n}\rho_i\Delta(ir)(-i) + \sum_{i=0}^{n}\upsilon_i\Delta(infl)(-i) \quad (2a)$$

$$\Delta(c) = \tau ect_{1b}(-1) + \sum_{i=1}^{n}\gamma_i\Delta(c)(-i) + \sum_{i=1}^{n}\theta_i\Delta(y)(-i) + \sum_{i=0}^{n}\nu_i\Delta(fe)(-i) + \sum_{i=0}^{n}\lambda_i\Delta(he)(-i) + \sum_{i=0}^{n}\lambda_i\Delta(ow)(-i) + \sum_{i=0}^{n}\kappa_i\Delta(unr)(-i) + \sum_{i=0}^{n}\rho_i\Delta(ir)(-i) + \sum_{i=0}^{n}\upsilon_i\Delta(infl)(-i) \quad (2b)$$

where Δ represent first-order differences, ect the cointegrating vector and ect(-1) is the error-correction term with (1a) and (1b) referring to the respective cointegrating vector.[8] Intuitively, τ should be negative so that when consumption is moving away from its equilibrium value, it adjusts back in the next periods. The larger τ is, the quicker the return to the equilibrium path. Equations (2a) and (2b) may be estimated with OLS.

Tests of financial deregulation in the existing literature

12. There are several issues involved when testing for financial deregulation. First, the deregulation process occurred at a different point in time across countries. Second, the timing of the impact of the reforms is uncertain. Finally, the effect on consumer behaviour might build up progressively over several years. The power of the testing procedures is affected by these considerations, and several procedures have been used in the literature to cope with these difficulties.

13. Two main procedures can be identified. First, estimation may be done on two sub samples, with the date at which the sample is cut corresponding to the introduction of financial liberalisation measures (Brechetta and Gerlach, 1997, Miles, 1994). It is expected that the coefficients on the wealth variable, reflecting their impact on consumption, will be higher after deregulation. This can also be tested by augmenting the coefficients with a zero-one dummy, taking the value one after deregulation (Sefton and In't Velt, 1998). More sophisticated dummies may be included, which do not shift from zero to one between two periods, but rise gradually from zero to one over several periods. For example, Bayoumi (1993) proposes a dummy for testing the impact of financial deregulation in the United Kingdom, which takes a value of zero in the seventies, increases progressively following the ratio of total consumer credit to GDP, and takes the value one until the end of the sample period, where the ratio of total consumer credit to

7. The total wealth specification was tested on the ground that for countries where the wealth effect may be weak, it will more easily appear in an aggregated framework. However, the disaggregated wealth effects might not all go in the same direction and their diverse influences provide a non significant aggregate effect.

8. This approach requires first to check that the variables are I(1), and then that the long run determinants of consumption cointegrate (see section IV). Tests for integration and cointegration are summarised in Tables 2 and 3.

GDP is used to proxy the increasing effect of financial deregulation. Along the same lines, Hendry and Ericsson. (1991), testing for the impact of financial deregulation on the demand for money, use a dummy as an exponential function of time, reflecting the pace at which financial liberalisation is thought to have taken place.

14. Another test used by Miles (1994) and Westaway (1993) for the United Kingdom, is to introduce a flow variable, such as housing equity withdrawal, in the equations and test for its significance. This variable represents new borrowing secured on housing that is not invested in the housing stock. Financial deregulation in the lending markets should permit households to borrow more using their houses as collateral to realise a non-housing purchase. In principle, this should not affect the long-run equilibrium value of consumer spending, but increase its short-term variations. However, to the extent that rising housing equity withdrawals reduce the borrowing constraint, and that most of financial liberalisation took place during the estimation period, this variable can also appear significant in the long-run relationships.

15. Empirical studies provide mixed evidence of the impact of financial deregulation throughout the G7 countries with the exception of Germany. Bayoumi (1993), Miles (1994), and Caporale and Williams (1997) provide evidence of an effect for the United Kingdom, peaking in the mid-1980s. For Canada and the United States (Williamson and Mahar, 1998 and Freedman, 1998) evidence of the impact of financial deregulation occurs also in the eighties. For the rest of the G7, evidence is very scarce. For France, it is generally recognised that financial deregulation has had little effect, most of the impact taking place slowly throughout the nineties (Williamson and Mahar, 1998). Similarly for Italy, Guiso and Jappelli (1999) argue that it would be difficult to provide empirical evidence at the macro level, since it was not very comprehensive. Hence, the proportion of households holding financial assets, though increasing, remains very small.[9] Furthermore, the level of indebtedness has remained low and the size of the household credit market small, reflecting low creditor protection. In Japan, limited effects of financial deregulation have been visible and there is a consensus that the increased availability of consumer credit has not contributed to lower private savings (Makin, 1986, Hayashi, 1986 and Shinohara, 1983).

Proposed testing methodology

16. To test for deregulation this study uses a strategy involving a battery of procedures. The aim is to identify whether consumer behaviour has changed, allowing for a progressive diffusion of the effects of financial liberalisation in the economy. The testing methods are the following:

(i) Estimation over sub-samples, where the break corresponds to the introduction of liberalisation measures;

(ii) Introduction of dummies, allowing a one-off shift or a smoother change in the coefficients;

(iii) Testing the significance of a variable reflecting credit deregulation

Approach *(i)* consists of estimating the relationships over sub-samples, where the break occurs at the estimated dates of financial deregulation. Since it might take some time for the effects of financial liberalisation to be fully appreciated, a rolling procedure was implemented, where the transition period is moved by one half year each time and the equation re-estimated in a sequential fashion. This permits a

9. Furthermore, the nineties are a very turbulent period in Italy: in 1992, the Italian lira went out of the ERM, and joined again in 1996. At the same time, a major reform of the pension and social security system was implemented in 1992 and further extended in 1995. See Rossi and Visco (1995) for some evidence on the likely impact of these reforms on Italian saving behaviour.

check on the date at which the effect of deregulation has fully gone through, as reflected by the significance and magnitude of the coefficients in the different sub-samples.

17. The framework for procedure *(ii)* is to augment the long-run equations to allow for a shift in the coefficients, following financial deregulation, which may be written as:

$$cy = \alpha + \beta(\ wealth\ ) + dummy.\beta'.(\ wealth\ )$$

where *wealth* is either total wealth or the various components of wealth described above. *Dummy* is either a zero-one dummy taking the value zero prior to deregulation and one after, or a time-varying dummy, following a procedure close to that of Bayoumi (1993). The time-varying dummy takes a value of zero before deregulation (deregulation being assumed not to take place anywhere before 1982), then rises at the same pace as new mortgages, up to the peak and takes the value one afterwards[10] The basic idea underlying this approach is that the new mortgages variable reflects the increase in consumer credit triggered by financial deregulation.[11]

18. The interpretation is the same whatever the type of dummy: before deregulation, the coefficient(s) on the wealth variable(s) is β, after deregulation it is augmented and becomes β+dummy*β. This specification implies common dates for the effect of financial liberalisation for all variables, but allows the strength of the impact to differ across variables. Finally, with approach *(iii)*, a significant equity withdrawal variable reflects households' increased borrowing capacity.

19. The above tests require priors on the dates of the impact of financial reforms. The process of liberalisation was not uniform, and the deregulation process differed across countries. For the United States and the United Kingdom, the process was relatively quick and almost completed by the mid-1980s. In some continental European countries and Japan, deregulation tended to occur later and was less comprehensive and important. The dates presented in Table 1 indicate important liberalisation steps and dummies were derived from those dates (Girouard and Blöndal, 2000).

20. All the tests were undertaken for the long-run relationships, within the constraints imposed by sample sizes. For the dynamic relationships, only two tests were performed: sub-samples estimation (using cutting dates determined by the results of the rolling tests on the long-run cointegrating vectors), and the significance of the equity withdrawal variable.

IV. Data and Estimation Results

Estimation of consumption regressions

21. The wealth data used in estimation are described in the notes to Figure 1, together with the sources. Other data come from the OECD Analytical Database (ADB). The frequency is semi-annual. Samples vary with data availability, but are generally between 1975 and 2000.

22. A necessary condition for variables to cointegrate in a long-run relationship like (1) is that they are integrated processes of order 1, *i.e.* non-stationary. This was tested for each variable using the Augmented Dickey Fuller (ADF) tests. Table 2 shows that most variables are found to be integrated of

10. This technique is very close to the estimation of time varying parameters.

11. When the growth rate was too volatile, the dummies were smoothed.

order 1 at a conventional level of significance. A few variables do not pass the tests, but taking into account the lack of power of this type of tests, together with evidence provided by other studies and the presence of what looks like regime change in these variables, it was decided to go ahead and proceed as if these variables were I(1). This appears reasonable, on the grounds that subsequent tests on the cointegrating relationships including these variables were passed (see Annex I), and that these relationships appeared significant in the dynamic estimation.

Table 2. **Augmented Dickey-Fuller test**

	United States	**Canada**	**United Kingdom**	**France**	**Italy**	**Japan**
Consumption as % of Household Disposable Income						
Level	-0.32	-0.86	-2.69 *	-1.63	0.49	-0.97
1st difference	-6.19 ***	-4.27 ***	-4.45 ***	-5.34 ***	-5.03 ***	-4.57 ***
Financial Wealth as % of Household Disposable Income						
Level	1.68	0.56	0.41	1.46	0.98	-0.83
1st difference	-3.37 **	-3.16 **	-2.61	-4.12 ***	-2.61 *	-3.81 ***
Housing Wealth as % of Household Disposable Income						
Level	-1.15	-3.07 **	-1.67	-2.77 *	-1.63	-0.89
1st difference	-3.02 **	-3.07 **	-1.87	-3.59 ***	-2.14	-4.35 ***
Other Wealth as % of Household Disposable Income						
Level	0.05	-2.16	-1.46	-0.69	-0.73	-1.86
1st difference	-3.43 **	-3.55 **	-2.43	-3.32 **	-3.38 **	-3.44 **
Total Wealth as % of Household Disposable Income						
Level	0.71	-0.01	-0.63	1.46	-1.66	-1.84
1st difference	-3.74 ***	-3.88 ***	-3.15 **	-4.60 ***	-3.02 **	-3.64 ***

*** Stationarity at 1% level of significance (MacKinnon critical values)

** Stationarity at 5% level of significance (MacKinnon critical values)

* Stationarity at 10% level of significance (MacKinnon critical values)

23. Tables 3 and 4 report estimation results for the G7 countries with the exception of Germany. Panel A reports the results for the long-term relationship as represented by equation (1), whereas panel B summarises the results for the short-term dynamics, as in equation (2). The existence of a cointegration relationship is tested with the ADF procedure testing the stationarity of the residuals. The usual standard tests (see Turner and Seghezza, 1998) are run for the dynamic relationships.

Table 3a. **Private consumption and net worth : long-run relationship**

	United States	Canada	United Kingdom	France	Italy	Japan
Total wealth	0.04	0.06	0.02	0.03	0.03	0.02
	(13.3)	(9.7)	(4.5)	(2.1)	(6.3)	(7.5)
Short-term interest rate	-0.003					
	(-5.0)					
Long-term interest rate		-0.011		0.003		-0.004
		(-11.2)		(2.0)		(-2.7)
Inflation rate					-0.009	-0.011
					(-7.2)	(-7.0)
Constant	-0.31	-0.28	-0.17	-0.30	-0.33	-0.23
	(-18.3)	(-8.7)	(-6.1)	(-4.5)	(-16.3)	(-12.0)
Time period	70:1 - 99:2	73:1 - 98:2	79:1 - 99:2	70:1 - 98:2	80:1 - 96:2	70:1 - 98:2
R2	0.81	0.92	0.41	0.09	0.85	0.89
Dummies			1993			
Cointegration tests ADF residuals (2 lags)	5%	5%	10% *	10% *	10% (1 lag)	5%

* without constant

Table 3b. **Private consumption and net worth : short-run relationship**

	United States	Canada	United Kingdom	France	Italy	Japan
ΔY	0.42	0.33	0.50	0.50	0.80	0.48
	(4.8)	(4.1)	(8.0)	(6.5)	(6.8)	(7.8)
ΔY(-1)				0.25		0.23
				(2.7)		(4.5)
ΔY(-2)						0.15
						(2.7)
ΔC (-1)	0.21				0.25	
	(1.7)				(2.5)	
ΔC (-2)	0.27	0.45		0.17		
	(2.9)	(5.6)		(2.0)		
ΔTotal wealth	0.09	0.19	0.16			0.10
	(2.7)	(2.3)	(4.1)			(4.6)
ΔTotal wealth (-1)						
ΔTotal wealth (-2)			0.22	0.08		
			(5.6)	(1.9)		
Δ^2 Total wealth (-1)					0.05	
					(1.8)	
ΔUnemployment rate		-0.003				
		(-2.0)				
Δ^2 Unemployment rate	-0.005					
	(-4.1)					
ΔInflation rate(-2)			-0.004	-0.003		
			(-2.6)	(-3.1)		
ΔInterest rate					-0.002	
					(-1.8)	
ΔInterest rate(-1)	-0.002	-0.003				
	(-2.4)	(-3.0)				
ECT[-1]	**-0.18**	**-0.31**	**-0.12**	**-0.08**	**-0.24**	**-0.18**
	(-2.4)	**(-3.1)**	**(-1.9)**	**(-1.7)**	**(-2.0)**	**(-3.1)**
Dummies					1993	
R2	0.82	0.87	0.72	0.92	0.93	0.90
SE	0.01	0.01	0.01	0.01	0.01	0.01
DW	2.00	1.80	1.54	2.01	1.86	1.81
Chow forecast test	0.87	0.62	0.95	0.32	0.38	0.48
Reset test	0.24	0.67	0.39	0.33	0.74	0.02
Serial correlation	0.09	0.12	0.40	0.95	0.14	0.36
Normality	0.03	0.38	0.68	0.57	0.87	0.22
Chow breakpoint test	0.27	0.01	0.00	0.13	0.41	0.06

Table 4a. **Private consumption and different component of wealth : long-run relationship**

	United States	Canada	United Kingdom	France	Italy	Japan
Financial wealth	0.04	0.10	0.04	0.08	0.08	0.12
	(13.1)	(19.5)	(5.2)	(3.0)	(23.5)	(16.6)
Housing wealth	0.03	0.19	0.04	0.05	-0.06	0.34
	(1.8)	(3.6)	(5.2)	(1.9)	(-7.1)	(8.1)
Other wealth			0.20	0.09		
Interest rate	-0.002	-0.008		0.009		
				(4.9)		
Constant	-0.26	-0.41	-0.40	-0.50	-0.32	-0.55
	(-12.3)	(-10.3)	(-9.4)	(-4.1)	(-27.5)	(-17.6)
Time period	70:1 - 99:2	73:1 - 98:2	82:1 - 99:2	70:1 - 96:2	80:1 - 96:2	75:1 - 98:2
R2	0.82	0.93	0.87	0.66	0.95	0.94
Dummies		1982 / 1993		1978 / 1987	1982	1989
Cointegration tests						
ADF residuals (2 lags)	1%	5%	5% *	5% *	5% *	1% *

* without constant

Table 4b. **Private consumption and different component of wealth : short-run relationship**

	United States	Canada	United Kingdom	France	Italy	Japan
ΔY	0.34	0.29	0.59	0.47	0.77	0.39
	(3.5)	(4.5)	(10.2)	(6.2)	(16.3)	(4.3)
ΔY(-1)		0.20		0.20		0.26
		(2.5)		(2.3)		(3.8)
ΔY(-2)						0.11
						(1.7)
ΔC(-1)	0.31					
	(2.6)					
ΔC(-2)	0.18	0.27		0.19		
	(1.7)	(2.7)		(2.4)		
ΔFinancial wealth			0.08		0.11	
			(3.2)		(5.1)	
ΔFinancial wealth (-1)	0.06	0.20				
ΔFinancial wealth (-2)			0.11	0.06		0.17
			(4.4)			
ΔHousing wealth			0.11			
ΔHousing wealth (-1)						
ΔHousing wealth (-2)					-0.09	
					(-4.5)	
ΔOther wealth				0.13		
				(3.8)		
ΔOther wealth (-1)					0.14	
ΔOther wealth (-2)	0.12				0.05	
	(1.7)				(6.0)	
Δ^2 Other wealth		0.25				
		(3.0)				
ΔUnemployment rate						
ΔUnemployment rate(-2)			-0.005			
			(-3.5)			
Δ^2 Unemployment rate	-0.005					
	(-3.8)					
ΔInterest rate(-1)		-0.004				
		(-2.5)				
ΔInflation (-2)				-0.003		
				(-2.6)		
ECT[-1]		-0.25			-0.30	-0.30
		(-2.8)			(-2.6)	(-3.3)
Dummies			1984 / 1989		1983 / 1993	1995
R2						
SE	0.005	0.01	0.00	0.01	0.00	0.01
DW	1.82	1.91	1.55	2.27	1.93	1.68
Chow forecast test	0.89	0.67	0.77	0.62	0.60	0.47
Reset test	0.04	0.28	0.64	0.55	0.58	0.24
Serial correlation	0.13	0.05	0.38	0.43	0.84	0.26
Normality	0.17	0.57	0.63	0.97	0.32	0.64
Chow breakpoint test	0.79	0.10	0.21	0.94	0.15	0.01

24. The overall results are satisfactory in the sense that the wealth variable is significant for all countries. Furthermore, the magnitude of the wealth effect is in line with previous OECD work (see Girouard and Blöndal, 2000 and Boone *et al.*, 1998). The long-run propensities to consume out of total wealth range between 2 per cent for the United Kingdom and Japan and 6 per cent for Canada. With the disaggregated specification of wealth, the long-term coefficients for financial wealth vary between a low value of 4 per cent for the United Kingdom and France and values equal to or above 10 per cent for Canada and Japan. The estimated housing wealth coefficients vary between 3 per cent and 5 per cent for the United States, the United Kingdom and France, but exceed 10 per cent for Canada and Japan. For Italy, the negative coefficient may reflect the specific features of home ownership in that country.[12] Dynamic specifications are also satisfactory in the sense that the error correction coefficients are always significant with the expected sign, and the range of values across countries is rather narrow.

Testing for financial deregulation: results

25. Results of the tests for the impact of financial deregulation on the long run relationships are summarised in Table 5 below and detailed in Tables A2, A3, and A4 in Annex II. Table 5 reports for each country whether there is evidence of financial deregulation using the various test procedures described above. Three groups of countries may be distinguished: the United States, the United Kingdom and Canada on the one hand, France and Italy on the other hand, and finally Japan. For the former group, there is evidence of an impact of financial deregulation in the sense that the coefficients, either on total wealth or on some components are affected. It is however difficult to quantify the impact of deregulation, as the magnitude of the impact is not the same across testing procedures. For the two continental European countries, the results are more mixed, possibly reflecting weaker deregulation or delayed effects that appear too late in the sample to be captured econometrically. Finally, for Japan, the absence of evidence may be caused by the strong influence of abundant liquidity in the financial markets due to the loose monetary policy or throughout the period since the mid-1980s.

Table 5. **Summary table: financial deregulation tests**

	Sub-sample estimates		0 - 1 dummies	Net mortgages dummies		Housing equity withdrawals
	wealth decompo-sition	total wealth		wealth decompo-sition	total wealth	
United States	+	+	+	+	-	+
Canada	+	+	+	-	-	+
United Kingdom	+	+	+	-	-	+
France	-	+	-	+	-	+
Italy	+	-	+	+	+	+
Japan	-	-	+	-	-	-

\+ Effect of financial deregulation
\- No effect of financial deregulation

12. Special features of the Italian housing market (see Guiso and Jappelli, 1999), together with the implementation of social security deregulation at the same time (see Rossi and Visco, 1995) might, at least partly, account for this result.

Testing for financial deregulation: a focus on housing equity withdrawals

26. The results reported in Table 6 are particularly interesting in the sense that the equity withdrawal variable appears significant and with similar magnitude for all equations, except Japan, with the value of other coefficients remaining stable for both the disaggregated and aggregated specification. Furthermore, the magnitude of the coefficient is very similar across the United States, the United Kingdom and Canada. This supports the hypothesis that rising housing equity withdrawals may have increased the consumption level in those countries. Again, this effect on the long-run level of consumption might not persist in the long term, but in our small sample sizes embodying the period of deregulation, this effect is significant.[13]

V. Conclusion

27. This paper analyses the impact of the different categories of wealth on long-run consumption. It shows that, within one country, different categories of wealth have a different impact on consumption. Across country, each type of wealth also has a quantitatively different impact on consumption. Regarding dynamic relationships, although the dynamic in itself, *i.e.* the lag structure, slightly differs across countries, the explanatory variables are broadly the same. The change in income, and change in each type of wealth, together with the error correction mechanisms, are found to explain consumption fluctuations well.

28. Several tests were run to assess the impact of financial liberalisation in the G7 in the 1980s and 1990s. Empirical results reflect the differences in timing and pace of the implementation of deregulation procedures across countries. For the United States, the United Kingdom and Canada, the effects of deregulation were felt in the early to mid-1980s, whereas in continental Europe, no impact appears before the early 1990s. Moreover, the impact is the highest on the long-run relationship, providing evidence that financial deregulation relaxed borrowing constraints, and hence the level of consumption. The absence of a marked impact in the dynamic relationships suggests that the short-run behaviour of consumers has not been affected by this phenomenon — at least not yet. Finally, no evidence was found for Japan, which may reflect a lack of liberalisation, but also the particular structure of wealth (the highest proportion being land), or again the turbulence the economy endured through the nineties.

29. The fragility of the empirical evidence of the effect of financial deregulation may have several explanations. The standard testing procedures may be inefficient. The housing equity withdrawals test, which provides robust evidence for all countries and all specifications, tends to support this explanation. Another explanation may lie with the timing of deregulation (for example, the samples may be inadequate for France and Italy where reforms occurred later on) or liberalisation may have diverse effects on the different components of wealth. Finally, the strength of the deregulation process may also vary across the countries.

13. When included in the dynamic relationships, the equity withdrawal variable appears only marginally significant (at the 20 to 30 per cent level), and often with the wrong sign while other coefficients are not significantly modified, which is in line with the sub samples tests realised on the dynamic regressions. This result may have two interpretations. Either the short-term behaviour of consumers has not been affected so much (yet) by the change in the borrowing markets (maybe because borrowing constraints in the short term have not been alleviated), or the effect is only on the level of consumption (as captured in the long-run relationships).

Table 6. **Private consumption, wealth and housing equity withdrawal : regression results**

	United States	**Canada**	**United Kingdom**	**France**	**Italy**	**Japan**
Financial wealth	0.04	0.10	0.05	-0.04	0.10	0.11
	(13.4)	(18.5)	(9.1)	(-2.2)	(8.7)	(10.4)
Housing wealth		0.22		-0.04		0.29
		(3.6)		(-1.1)		(5.9)
Other wealth			0.18	-0.03		
			(5.5)	(-0.9)		
Housing equity withdrawal	0.005	0.005	0.008	0.017	0.006	-0.001
	(3.9)	(2.9)	(5.9)	(5.9)	(1.8)	(-0.3)
Interest rate	-0.002	-0.007				
	(-3.8)	(-5.4)				
Constant	-0.22	-0.43	-0.36	0.05	-0.48	-0.51
	(-21.3)	(-9.7)	(-9.5)	(0.5)	(-10.1)	(-9.8)
Time period	70:1 - 99:2	73:1 - 98:2	82:1 - 99:2	70:1 - 97:2	76:1 - 96:2	77:1 - 97:2
R2	0.85	0.90	0.92	0.64	0.82	0.93
Dummies			1993	1978		1989
Cointegration tests						
ADF residuals (2 lags)	5%	5%	5%	5% *	5% *	10%

* without constant

	United States	**Canada**	**United Kingdom**	**France**	**Italy**	**Japan**
Total wealth						
Housing equity withdrawal	0.003	0.009	0.009	0.017	0.005	-0.006
	(1.9)	(4.2)	(9.9)	(7.6)	(2.4)	(-1.4)
Real interest rate	-0.003			0.003		
	(-5.2)			(3.0)		
Nominal interest rate		-0.002			-0.005	
		(-1.8)			(-4.4)	
Constant	-0.30	-0.49	-0.17	0.08	-0.27	-0.32
	(-16.4)	(-11.4)	(-11.4)	(1.4)	(-8.3)	(-8.3)
Time period	70:1 - 99:2	73:1 - 98:2	79:1 - 99:2	74:2 - 98:2	80:1 - 96:2	77:1 - 97:2
R2	0.82	0.86	0.83	0.68	0.88	0.78
Dummies			1993			
Cointegration tests	5%	10%	1%	10%	10%	5%
ADF residuals (2 lags)						

* without constant

30. From here, several directions for further research may be suggested. Firstly, the testing procedures appear pretty crude, and more sophisticated methods could be developed. For instance, the utilisation of a variable reflecting the evolution of the banking sector's share in mortgage loans could be an interesting indicator of the deregulation process. Secondly, as time passes, evidence will probably become firmer, suggesting that one might expect to allow some time before seeing the full impact of these measures on behaviour, particularly in continental Europe. Finally, for those countries where it was difficult to find evidence, this might suggest that deregulation was not as important as it could have been, and that further efforts in implementing financial deregulation might be warranted.

ANNEX I

JOHANSEN COINTEGRATION TESTS

Table A1. **Johansen cointegration tests**

United States

Lags	Constant	C/Y	Feq/Y	Heq/Y	Twt/Y	Irsr
6	0.286	1.000	-0.040	-0.059		0.003
	(0.024)		(0.005)	(0.014)		(0.000)
8	0.620	1.000	-0.088	-0.290		0.007
	(0.060)		(0.012)	(0.032)		(0.001)
2	0.304	1.000			-0.041	0.002
	(0.026)				(0.005)	(0.001)
4	0.303	1.000			-0.041	0.002
	(0.022)				(0.004)	(0.001)
6	0.315	1.000			-0.044	0.003
	(0.018)				(0.003)	(0.000)

Canada

Lags	Constant	C/Y	Feq/Y	Heq/Y	Twt/Y	Irlr	Irl
2	0.658	1.000	-0.103	-0.611		0.008	
	(0.142)		(0.015)	(0.205)		(0.003)	
4	0.878	1.000	-0.128	-0.881		0.005	
	(0.145)		(0.012)	(0.214)		(0.003)	
6	0.422	1.000	-0.097	-0.225		0.008	
	(0.072)		(0.005)	(0.109)		(0.001)	
4	0.418	1.000			-0.092		0.010
	(0.063)				(0.013)		(0.002)
6	0.068	1.000			-0.015		0.014
	(0.063)				(0.014)		(0.001)

United Kingdom

Lags	Constant	C/Y	Feq/Y	Heq/Y	Nwt/Y	Twt/Y
2	1.653	1.000	-0.130	-0.538	0.899	
	(1.384)		(0.260)	(0.209)	(1.134)	
4	0.339	1.000	-0.035	-0.040	-0.131	
	(0.019)		(0.004)	(0.003)	(0.017)	
6	0.072	1.000				0.003
	(0.077)					(0.014)

Table A1. **Johansen cointegration tests (cont.)**

France

Lags	Constant	C/Y	Feq/Y	Heq/Y	Nwt/Y	Irlr	Twt/Y	Irl
2	-12.249	1.000	3.244	0.961	3.970	0.214		
	(3.200)		(0.678)	(0.618)	(0.989)	(0.050)		
4	-4.824	1.000	1.246	0.612	1.450	0.051		
	(2.171)		(0.479)	(0.369)	(0.667)	(0.034)		
4	0.827	1.000					-0.113	-0.019
	(0.215)						(0.044)	(0.004)

Italy

Lags	Constant	C/Y	Feq/Y	Heq/Y	Twt/Y	Inf
4	0.247	1.000	-0.112	0.145		
	(0.028)		(0.008)	(0.023)		
6	0.189	1.000	-0.097	0.166		
	(0.008)		(0.004)	(0.010)		
2	0.357	1.000			-0.031	0.008
	(0.027)				(0.006)	(0.002)
4	0.233	1.000			-0.014	0.018
	(0.029)				(0.006)	(0.002)

Japan

Lags	Constant	C/Y	Feq/Y	Heq/Y	Twt/Y	Irlr	Inf
2	0.822	1.000	-0.184	-0.691			
	(0.091)		(0.021)	(0.132)			
4	0.678	1.000	-0.143	-0.551			
	(0.082)		(0.019)	(0.115)			
6	0.168	1.000			-0.008	0.001	0.020
	(0.016)				(0.002)	(0.001)	(0.002)

Note : C = Private consumption
Y = Disposable income
Feq = Financial wealth
Heq = Housing wealth
Nwt = Other wealth
Twt = Total wealth
Irsr = Real short-term interest rate
Irlr = Real long-term interest rate
Irs = Nominal short-term interest rate
Irl = Nominal long-term interest rate
Inf = Inflation rate

ANNEX II

DETAILED TEST RESULTS

1. This annex presents the results of the various tests in more details. Table A2 presents the results by sub samples, Table A3 using the zero-one dummy procedure and Table A4 the net mortgage dummies.

Sub sample estimation and zero-one dummy tests

2. For the US, sub-samples estimation provides evidence of a clear impact of financial liberalisation with a higher long-run elasticity on wealth variables after 1983. For Canada, both tests showed effects of financial liberalisation, with the coefficients on financial and housing wealth appearing higher and more significant after deregulation. In the United Kingdom, limited effect of financial deregulation is provided with the disaggregated wealth specification, which may be due to the fact that the sample only starts in 1982, when the first measures of deregulation have probably already gone through. However, when using the total wealth specification for the sub samples estimation, and disaggregated wealth with the dummy procedure, the wealth coefficient is significant and higher after financial deregulation. For Italy, despite negative housing wealth effects, higher and more significant financial wealth coefficients are reported in the sub-sample estimation. With the zero-one dummy procedure, evidence of financial liberalisation is also visible. For France, no evidence of financial liberalisation is available when using the zero-one dummy method, but there seems to be an impact when the test is based on sub-sample estimation using the total wealth specification[1]. Finally, for Japan, it is impossible to show evidence of any impact at all. This possibly reflects the strong influence of abundant liquidity in the financial markets due to the loose monetary policy throughout the nineties.

3. The dynamic relationship for each country was estimated over the same sub samples. It turns out more difficult to provide evidence of a change in the consumer behaviour in the short- term. Although the coefficients on wealth (either total wealth or the components of wealth) generally appear higher, as well as the error-correction mechanism, the relationships are more fragile, and the significance level of the coefficients is only around 20-25 per cent across countries.[2] Only for France and Italy there appear to be a somewhat better statistical relationship, with more robust coefficients on wealth variables in the second period. An interpretation may be that although the long-run target level of the consumption to income ratio may have only started to change for France and Italy, consumers behaviour may be beginning to evolve, with growth in consumption increasingly responding to growth in financial and housing wealth. It is however difficult to say whether this reflect a change in short-run behaviour, or a more permanent change that will appear when the impact of financial deregulation has spread through the economy**.**

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1. For France, the only piece of evidence in favour of an impact of financial deregulation that we are aware of, is a note from the Ministry of Finance on the estimation of a dynamic consumption equation. It argues that a dummy taking the value 1 between 1986 and 1990 (over an estimation period 1986-1999) can be interpreted as a proxy for the influence of financial deregulation on the household level of indebtedness (see Sandrine Duchêne (1999), "Une modélisation de la consommation des ménage", Direction de la Prévision, ministère des Finances, Paris).

2. For this reason, results are not reported but may be given by the authors upon request.

Table A2. **Test for financial deregulation : estimation of coefficients by sub-sample**

	United States	**Canada**	**United Kingdom**	**France**	**Italy**	**Japan**
Date	1982:2	1983:2	1986:1	1986:1	1987:2	1989:2
Financial wealth						
Coef (full sample)	0.04	0.10	0.04	0.08	0.08	0.12
(t-stat)	(13.1)	(20.4)	(5.2)	(3.0)	(27.3)	(19.5)
Coef (1st period)	0.01	0.02	0.09	0.08	0.10	0.12
(t-stat)	(1.4)	(0.5)	(1.9)	(2.6)	(4.6)	(14.8)
Coef (2nd period)	0.04	0.11	0.04	0.07	0.13	0.04
(t-stat)	(7.7)	(10.8)	(3.7)	(2.3)	(15.8)	(1.6)
Housing wealth						
Coef (full sample)	0.03	0.19	0.04	0.05	-0.06	0.34
(t-stat)	(1.9)	(3.7)	(5.2)	(1.9)	(8.1)	(9.2)
Coef (1st period)	0.08	0.07	0.06	0.01	-0.04	0.37
(t-stat)	(2.8)	(1.0)	(0.8)	(0.5)	(-2.1)	(5.2)
Coef (2nd period)	-0.02	0.38	0.04	-0.08	-0.15	0.13
(t-stat)	(-0.1)	(3.6)	(2.6)	(-1.4)	(-10.9)	(1.9)
Other wealth						
Coef (full sample)			0.20	0.09		
(t-stat)			(5.8)	(2.3)		
Coef (1st period)			0.41	0.00		
(t-stat)			(6.1)	(0.1)		
Coef (2nd period)			0.17	0.18		
(t-stat)			(2.4)	(5.8)		
Interest rate						
Coef (full sample)	-0.003	-0.008		0.009		
(t-stat)	(3.8)	(8.4)		(4.9)		
Coef (1st period)	-0.004	-0.008		0.003		
(t-stat)	(5.0)	(5.1)		(1.8)		
Coef (2nd period)	-0.001	-0.007		0.005		
(t-stat)	(1.3)	(3.6)		(0.9)		
Total wealth						
Coef (full sample)	0.04	0.06	0.02	0.03	0.03	0.02
(t-stat)	(13.3)	(9.7)	(4.6)	(2.2)	(6.3)	(7.5)
Coef (1st period)	0.02	0.06	0.04	0.07	0.06	0.02
(t-stat)	(1.8)	(2.6)	(3.5)	(2.4)	(2.3)	(4.9)
Coef (2nd period)	0.04	0.07	0.05	0.08	0.02	0.01
(t-stat)	(10.0)	(4.8)	(5.7)	(3.5)	(2.3)	(2.0)
Interest rate						
Coef (full sample)	-0.003	-0.011		0.003		-0.004
(t-stat)	(5.0)	(11.2)		(2.0)		(2.7)
Coef (1st period)	-0.002	-0.012		0.002		0.001
(t-stat)	(4.5)	(11.5)		(1.8)		(0.1)
Coef (2nd period)	-0.003	-0.008		0.021		-0.004
(t-stat)	(2.6)	(2.8)		(6.0)		(2.4)

Table A3. **Test for financial deregulation : estimation of coefficients with a 0-1 dummy procedure**[1]

	United States	**Canada**	**nited Kingdom**	**Italy**	**Japan**
	TWT[2]	FEQ[3]	FEQ[3]	TWT[2]	TWT[2]
Before deregulation	0.04	0.08	0.04	0.02	0.02
(t-stat)	(9.5)	(4.9)	(7.1)	(1.6)	(7.8)
After deregulation	0.04	0.10	0.05	0.05	0.02
(t-stat of coefficient after deregulation)	(2.2)	(1.6)	(2.0)	(3.9)	(1.7)
Date[5]	1981:1	1988:1	1987:1	1987:1	1996:2

Notes:

1. A zero-one dummy allows the magnitude of the coefficient to change after deregulation.
2. TWT = Total wealth
3. FEQ = Financial wealth
4. HEQ = Housing wealth
5. Date after which the dummy takes a value of one.

Net mortgages dummies

4. Tests with the introduction of a net mortgage time varying dummy corroborate the results obtained above for the United States: higher coefficients on the financial wealth variable are reported after the deregulation. Similarly, for Italy, statistically significant impact of financial deregulation is reported with both specification of wealth as in the procedure above. For France, important effects on housing wealth and interest rates are provided, possibly reflecting some loosening of the borrowing constraints in the later part of the sample[3]. For other countries, limited impact on the coefficients may be observed after deregulation.

3. These results should be interpreted with care as the sign of the interest rate in the second time period varies with the testing procedure. A positive sign can be interpreted as the fact the French households tend to be net creditors.

Table A4. **Test for financial deregulation : estimation of coefficients with net mortgage dummies**

	United States	Canada	United Kingdom	France	Italy	Japan
Financial wealth						
Before deregulation	0.01	0.09	0.07	0.07	0.08	0.13
(t-stat)	(1.6)	(3.0)	(0.6)	(3.4)	(6.0)	(15.2)
After deregulation	0.03	0.09	0.07	-0.76	0.13	0.13
(t-stat)	(3.9)	(3.0)	(0.6)	(-2.0)	(3.3)	(15.2)
Housing wealth						
Before deregulation	0.07	0.19	0.05	0.02	-0.06	0.31
(t-stat)	(2.6)	(3.1)	(0.3)	(0.9)	(-5.3)	(5.2)
After deregulation	-0.02	0.19	0.05	1.64	-0.13	0.31
(t-stat)	(-3.7)	(3.1)	(0.3)	(2.3)	(-4.2)	(5.2)
Other wealth						
Before deregulation			0.08	0.01		
(t-stat)			(1.0)	(0.3)		
After deregulation			0.08	-2.41		
(t-stat)			(1.0)	(-3.4)		
Interest rate						
Before deregulation	-0.004	-0.007		0.004		
(t-stat)	(4.6)	(4.3)		(2.6)		
After deregulation	0.000	-0.007		-0.062		
(t-stat)	(2.4)	(4.3)		(1.7)		
Total wealth						
Before deregulation	0.04	0.08	0.06	0.11	0.02	0.02
(t-stat)	(7.6)	(4.2)	(7.3)	(6.4)	(1.4)	(4.5)
After deregulation	0.04	0.08	0.05	0.03	0.04	0.02
(t-stat)	(1.4)	(4.2)	(-5.3)	(-4.3)	(3.4)	(4.5)
Interest rate						
Before deregulation	-0.002	-0.011		0.001		-0.002
(t-stat)	(3.8)	(10.5)		(1.3)		(1.0)
After deregulation	-0.002	-0.011		0.023		-0.002
(t-stat)	(3.8)	(10.5)		(1.7)		(1.0)

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