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Tax Evasion and Swiss Bank Deposits

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Resumé

Bankkonti i jurisdiktioner med bankhemmelighed udgør et effektivt instrument til at undvige skatter på renteindkomst. En nyligt indført EU reform reducerer gevinsten ved denne type skatteundvigelse ved at pålægge en kildeskat på EU borgeres renteindkomst i Schweiz og en række andre jurisdiktioner med bankhemmelighed. I dette papir estimeres effekten af kildeskatten på værdien af schweiziske bankkonti ejet af EU borgere. Det forhold, at kun EU borgere var berørt af kildeskatten, gør det muligt at opfatte reformen som et naturligt eksperiment. Det estimeres at kildeskatten på 15 pct. reducerede værdien af schweiziske bankkonti ejet af EU borgere med mere end 40 pct. Den største del af denne adfærdsmæssige respons fandt sted i to kvartaler umiddelbart før og efter reformen. Estimaterne implicerer en elasticitet af værdien af schweiziske bankkonti med hensyn til efter-skat-raten på omkring 2,75. Den estimerede elasticitet benyttes til at evaluere kildeskattens velfærdsegenskaber. I lyset af de store adfærdsmæssige responser konkluderes det, at kildeskatten er forbundet med et meget stort dødvægtstab og at kildeskatteraten på 35 pct., som vil være gældende fra 2011, er væsentligt højere end den provenumaksimerende kildeskatterate.

Tax Evasion and Swiss Bank Deposits*

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7 May 2010

Abstract

Bank deposits in jurisdictions with banking secrecy constitute an effective tool to evade taxes on interest income. A recent EU reform reduces the scope for this type of tax evasion by introducing a source tax on interest income earned by EU residents in Switzerland and several other jurisdictions with banking secrecy. In this paper, we estimate the impact of the source tax on Swiss bank deposits held by EU residents while using that non-EU residents were not subject to the tax to apply a natural experiment methodology. We find that the 15% source tax caused Swiss bank deposits of EU residents to drop by more than 40% with most of the response occurring in two quarters immediately before and after the source tax was introduced. The estimates imply an elasticity of Swiss deposits with respect to the net-of-source-tax-rate of around 2.75. The estimated elasticity is used to evaluate the efficiency properties of the tax. Given the large responsiveness of tax evaders, we find that the tax is associated with a very significant deadweight loss and that the 35% tax rate scheduled to apply from 2011 is considerably above the revenue maximizing rate.

Keywords: Tax evasion, Capital taxation, Tax competition, Savings Directive

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1 Introduction

In recent years, tax evasion has moved to the center of academic debates about tax policy. Increasingly, it has been recognized that behavioral responses to taxation take many other forms than labor supply responses. This is confirmed by Feldstein (1995) and others who consistently find that taxable income is much more responsive to taxation than labor supply. This finding has spurred an interest in the wide array of behavioral responses to taxation, notably tax avoidance and tax evasion.

It is often argued that residence-based capital taxes are particularly prone to tax evasion. Since capital is internationally mobile, effective enforcement requires that tax authorities can obtain information about foreign source income. Where information exchange between tax authorities is absent, individuals can evade capital taxes simply by placing assets in foreign jurisdictions and not reporting the capital income. In practice, international information exchange is highly imperfect and leaves considerable scope for tax evasion.

The specific focus of this paper is evasion of taxes on interest income. The scope for this type of tax evasion is especially large since information exchange is further impeded by banking secrecy. In most countries, banks are required to protect customer information and some degree of secrecy thus forms part of almost any banking system. In some jurisdictions, however, banking secrecy is an almost absolute principle and government authorities do not have access to banking information except in serious criminal cases concerning, for instance, terrorism and drug trafficking. In this form, banking secrecy clearly constitutes a barrier to effective taxation of interest income.

Recognizing the need for international cooperation, significant efforts have been devoted to combat tax evasion by the OECD and the EU. The OECD promotes transparency and encourages tax havens to conclude bilateral tax treaties with countries based on the principle of 'information exchange upon request'. Bilateral tax treaties allow countries to obtain banking information about suspected tax evaders from cooperating tax havens. The political pressure on jurisdictions not complying with the OECD standards of transparency is mounting and the G20 countries recently agreed on a set of economic sanctions to be employed against such non-cooperating tax havens (OECD, 2010). The EU approach is more pragmatic. Under the Savings Directive, an agreement between the EU countries and a number of jurisdictions with banking secrecy, the latter jurisdictions apply a source tax to the interest income of EU residents and transfer 75% of the tax revenue to the residence countries. This approach allows for effective taxation of foreign source interest income while allowing tax havens to maintain the banking secrecy.

While the current reforms of the international tax environment go some way towards establishing effective taxation of interest income, it is important to realize that the reforms have a limited scope. As for the OECD approach, the incompleteness of treaty networks implies that tax evaders generally have the possibility to place assets in a jurisdiction that does not exchange information with their country of residence. Moreover, information exchange upon request only allows tax administrations to obtain banking information when there is a reasonable suspicion of tax evasion, hence evaders can often

eliminate the risk of detection by avoiding transactions that draw the attention of the domestic tax administration. As for the EU approach, a number of strategies allow tax evaders to avoid the source tax. Most obviously, tax evaders may move bank deposits to non-cooperating tax havens. Alternatively, the formal ownership of bank deposits may be transferred to an offshore trust or bank deposits may be replaced with structured finance products with very similar characteristics.

When designing policy measures to combat tax evasion, the key parameters relate to the behavioral responses of tax evaders. Since policy measures typically target a subset of available evasion strategies, they are likely to induce increases in compliance as well as substitution towards alternative evasion strategies. The size of these behavioral responses are the fundamental determinants of optimal policy. Despite the obvious policy relevance, there is very little available empirical evidence on how tax evaders respond to changes in the international tax environment. This paper produces evidence of this sort and analyzes the policy implications.

The main contribution of the paper is to estimate the responses of tax evaders to the source tax introduced by the Savings Directive. The analysis is complicated by the furtive nature of tax evasion and the fact that evaded taxes are not directly observable. We take an indirect approach and estimate the effect of the source tax on something presumably closely associated to evasion of taxes on interest income, Swiss bank deposits.[1] Switzerland is the country most notorious for banking secrecy and non-cooperation in international tax matters. At the heart of the protection of foreign tax evaders lies the legal principle of dual criminality, which implies that banking information may only be released by Swiss banks and provided to foreign tax authorities in cases where the alleged offence would constitute a criminal act under Swiss law. Since the simple non-declaration of income is not considered a criminal act under Swiss law, foreign tax evaders with Swiss bank deposits essentially have legal certainty that banking information is not transmitted to their country of residence.

We exploit that the Savings Directive increased taxes on Swiss source interest income of tax evaders resident in EU countries while not directly affecting tax evaders resident outside the EU. This allows us to apply a natural experiment methodology where the treatment group is EU residents with Swiss bank deposits and the control group is non-EU residents with Swiss bank deposits. The estimated treatment effect is large and very robust. Using different control groups and specifications, we consistently find that the 15% source tax reduced bank deposits of EU residents in Switzerland by around 40%. Most of the estimated reduction in Swiss deposits occurred during just two quarters immediately before and after implementation of the Savings Directive, which strongly supports a causal interpretation of the estimates. The implied elasticity of Swiss deposits with respect to the net-of-tax rate is in the range 2.5-3. Using the same methodology, we estimate the impact on bank deposits in other offshore financial

[1] Indirect approaches are fairly common in the empirical literature on tax evasion (Slemrod, 2007). For instance, Pissarides and Weber (1989) estimate a model of food consumption and find that self-employed spend a larger proportion of reported income on food than employees. Arguing that this finding reflects underreporting of income rather than a higher propensity to consume food, they obtain an estimate of the size of the black economy. In a more recent paper, Feldman and Slemrod (2007) apply a similar methodology using differences in charitable giving to identify the degree of underreporting.

centers covered by the Savings Directive. In line with the results for Switzerland, we find that the source tax reduced bank deposits of EU residents in Luxembourg, Jersey, Guernsey and the Isle of Man considerably although the effects are generally somewhat smaller and less precisely estimated.

The empirical results have significant policy implications. While our framework does not allow for a rigorous distinction between different types of behavioral responses, there are important reasons to believe that the estimated reduction in Swiss deposits reflected substitution towards other evasion strategies rather than increased compliance. Under this assumption, we use the estimates of the evasion elasticity to compute the source tax rate that maximizes government revenue and find that this rate is around 27%. If tax evaders have no weight in the social welfare function, the optimal tax rate coincides with the revenue maximizing tax rate. If tax evaders have some weight in the social welfare function, the optimal tax rate is even lower. This strongly suggests that the source tax rate of 35% projected to apply from 2011 is suboptimally high.

Two previous papers estimate the effect of tax variables and institutional variables on patterns of cross-border deposits. Alworth and Andresen (1992) estimate a gravity model for three different years and report modestly sized effects on deposits of the net-of-source-tax-rate when interacted with an index of banking secrecy. Huizinga and Nicodème (2004) estimate a panel equation and find no statistically significant effects of source taxes in the preferred specification with source and residence country dummies. A key advantage of our empirical methodology is that identification derives exclusively from the time variation in source tax rates associated with the Savings Directive. Due to the general scarcity of time variation in source tax rates, both previous studies rely predominantly on cross-country variation.[2] A further advantage of our approach is that the differential treatment of EU residents and non-EU residents implied by the Savings Directive provides intra–jurisdiction variation in source tax rates that enables us to identify the tax elasticity of foreign deposits in specific banking jurisdictions. This allows us to focus on Switzerland and other banking jurisdictions where presumably the majority of foreign deposits is associated with tax evasion so that the estimated tax elasticity of foreign deposits may be interpreted as an evasion elasticity. Conversely, existing papers estimate a single equation with all available bilateral data, which implies that estimates effectively average tax elasticities of foreign deposits across banking jurisdictions. These estimates are difficult to interpret since small tax elasticities of foreign deposits could reflect either small evasion elasticities or a large fraction of deposits being owned by non-evaders who are generally unaffected by source taxes.

Finally, a recent paper examines the effects of the Savings Directive focusing on bonds rather than deposits. Klautke and Weichenreider (2008) exploit that bonds issued prior to 2001 are exempt from the source tax. Their main finding is that exempt bonds are not associated with a lower pre-tax return than otherwise comparable taxable bonds, which suggests that other techniques to avoid the source tax introduced by the Savings Directive are readily available. This is consistent with our assumption that

[2] Alworth and Andresen (1992) rely exclusively on cross-border variation. In some specifications, Huizinga and Nicodème (2004) include *country* fixed effects, however, *country-pair* fixed effects would be needed to absorb all non-temporal variation.

the large estimated reduction in Swiss deposits reflected substitution towards other evasion strategies rather than increased compliance.[3]

The paper is structured as follows. Section 2 lays out institutional details of the international tax environment and places the Savings Directive in this context. Section 3 describes the deposit data used in the regressions. Section 4 presents our empirical framework and discusses various threats to identification. Section 5 presents the results. Section 6 discusses policy implications. Section 7 provides some concluding remarks.

2 Background

Switzerland is notorious for banking secrecy and there is abundant anecdotal evidence that Swiss banks play an important role in international tax evasion. This section describes the international tax environment relevant for individuals evading taxes on interest income in more detail in order to highlight the institutional features that make Swiss banks attractive for foreign tax evaders and lays out the details of the Savings Directive.

2.1 The international tax environment

Taxation of interest income is generally governed by the residence principle, hence interest income is taxable in the residence country regardless of where it is earned. To the extent that individuals do not self-report foreign source interest income, enforcement of the residence principle requires information exchange between tax authorities. The OECD (2006) lists two conditions necessary to ensure effective exchange of information. Firstly, there must be a legal basis for exchange of information. In some countries, domestic law allows tax administrations to share information with foreign tax administrations. More commonly, the legal basis for information exchange is a bilateral agreement in the form of a Double Tax Convention or a Tax Information Exchange Agreement. Secondly, domestic tax administrations must have access to the information requested by foreign tax administrations. In the present context, the major obstacle is the banking secrecy laws that in some jurisdictions severely restrict access to banking information for domestic tax authorities.

Even when these two conditions are satisfied, however, enforcement of the residence principle may be far from perfect. Bilateral agreements typically provide for 'information exchange upon request' which has the obvious limitation that requests must relate to a specific tax payer and "...demonstrate the foreseeable relevance of the information requested..." (OECD, 2002). In other words, information can only be obtained from the source country when the tax authorities of the residence country have prior knowledge about illegal transactions. Recognizing this limitation, a number of countries engage in automatic information exchange with at least some partner countries. Clearly, automatic information

[3] A policy paper from the European Commission uses national account data, deposit data and government revenue data to assess the impact of the Savings Directive (Hemmelgarn and Nicodème, 2009). The paper uses mostly descriptive methods and concludes that the Savings Directive had no measurable effects.

exchange does not suffer from the deficiencies of information exchange upon request since it does not require that the tax authorities of the residence country have prior knowledge of irregularities.

OECD (2006) provides a summary of the institutional features determining effective information exchange between tax administrations around the time the Savings Directive was implemented. Most OECD countries were committed to provide information upon request to a large number of treaty partners and many countries moreover provided information to non-treaty partners on the basis of domestic law. Switzerland stands out as the only jurisdiction that never provided banking information in cases of simple tax evasion. Under the principle of dual criminality, Switzerland only provided banking information in criminal cases as defined by the Swiss penal code. The legal standard used to determine criminality in tax cases was tax fraud defined as tax evasion conducted by means of false documents or the like whereas the mere non-declaration of income was not considered fraud. In other words, the Swiss information exchange regime offered perfect protection for foreign tax evaders using Swiss bank accounts to evade taxes on interest income. Other jurisdictions with a comparable level of protection for foreign tax evaders were the Cayman Islands and the Bahamas where only a single bilateral treaty (with the US) provided for information exchange and only in criminal matters. Jersey, Guernsey and the Isle of Man had very limited treaty commitments, however, mutual assistance laws allowed for some cooperation with foreign tax administrations in criminal tax matters.

Turning to banking secrecy, OECD (2006) reports that tax authorities in most countries could obtain banking information in all tax matters and that in some countries banks were even required to transmit tax relevant information automatically. In Switzerland, Luxembourg, Austria, Belgium, Jersey, Guernsey and the Isle of Man, access to banking information was restricted to criminal matters. Importantly, Switzerland and Luxembourg applied a dual criminality test when banking information was requested by foreign tax authorities. The legal standard used to determine criminality in Luxembourg was tax fraud defined somewhat more broadly than in Switzerland. Specifically, Luxembourg lifted the banking secrecy in cases of simple non-reporting of interest income when the amount of evaded taxes was large or constituted a large fraction of the total tax liability.[4] The banking secrecy rules of Austria, Belgium, Jersey, Guernsey and the Isle of Man were considerably less restrictive. The absence of a dual criminality test in these jurisdictions implied that the banking secrecy was lifted in cases of simple tax evasion to the extent that it was considered a criminal offence in the residence country of the evader. Singapore restricted access to banking information to cases with a domestic tax interest thus effectively protecting foreigners using Singapore bank accounts to evade capital taxes in the residence country.

In summary, at the eve of the implementation of the Savings Directive there were large disparities between jurisdictions in terms of their effective assistance to foreign countries in tax evasion cases. In a handful of jurisdictions, the scope for assistance was very limited, which effectively provided foreign tax evaders with a high level of protection against detection. In simple cases of tax evasion, Switzerland, Singapore and the tax havens in the Caribbean provided foreigners with the most effective protection.

[4]KPMG Luxembourg indicate on their website that tax evasion usually falls under the Luxembourg definition of tax fraud when the evaded amount exceeds €100.000 or constitutes more than 25% of the total tax liability.

Other jurisdictions with a very limited scope for provision of banking information to foreign countries included Luxembourg, Jersey, Guernsey and the Isle of Man.

2.2 The Savings Directive

The aim of the Savings Directive is to establish effective taxation of the foreign interest income of EU resident individuals. Initially, it covered 25 EU countries and 15 non-EU jurisdictions of which 5 were countries (i.e. Switzerland, Andorra, Liechtenstein, Monaco and San Marino) and 10 were dependent territories (i.e. Jersey, Guernsey, Isle of Man, Cayman Islands, Bahamas and five smaller financial centers in the Caribbean). Negotiations between the European Commission and the 15 non-EU jurisdictions were concluded toward the end of 2004 and the Savings Directive took effect simultaneously in all participating jurisdictions on 1 July 2005. The EU enlargement on 1 January 2007 brought the number of participating jurisdictions to 42.

The Savings Directive provides for two alternative regimes of international cooperation based on automatic information exchange and withholding taxes respectively. The first regime requires banks to report interest income earned by foreign EU residents to their local tax authorities who periodically and automatically convey this information to the tax authorities of the residence country.[5] The second regime requires banks to levy a withholding tax on the interest income of foreign EU residents at 15% in 2005 gradually increasing to 20% in 2008 and 35% in 2011. Since the withholding tax in the source country effectively replaces taxation in the residence country, 75% of the revenue from the tax is transferred to the residence country. While most EU countries adopted the information exchange regime, Austria, Belgium and Luxembourg as well as most of the non-EU jurisdictions including Switzerland opted for the withholding tax regime to safeguard banking secrecy laws. It should be noted, however, that in any jurisdiction where the withholding tax regime is the default, individuals may avoid the withholding tax by accepting that information on interest income be automatically transmitted to their country of residence. This implies that the withholding tax effectively targets tax evaders unwilling to disclose tax relevant banking information.

As emphasized by the European Commission (2008), the Savings Directive has a limited scope and tax evaders may circumvent its provisions in a number of ways. Firstly, geographical coverage is partial, hence moving assets to a non-participating jurisdiction is a simple and effective evasion strategy. Secondly, since the Savings Directive includes no substance-over-form test, transferring the formal ownership of assets to a trust in a non-participating jurisdiction suffices to fall outside its scope. Thirdly, investors may engage in a type of income shifting whereby interest bearing assets are replaced with structured finance products with returns linked to leading interest rates. In substance, such derivatives are identical to debt claims, yet returns are not formally interest payments and are therefore not subject to the provisions of Savings Directive.

[5] To be precise, the STD applies not only to banks but also to other economic operators making interest payments to individuals, e.g. mutual funds, fiduciaries and financial companies other than banks.

3 Data

The principal source of information on cross-border deposits is the International Locational Banking Statistics of the Bank for International Settlements ('BIS'), which reports quarterly data on assets and liabilities of banks vis-a-vis foreign counterparts. Observations state end-of-quarter values in US dollar equivalents. Currently, a total of 40 jurisdictions contribute banking statistics to BIS including most OECD countries, a handful of newly industrialized countries and a number of offshore financial centers. For Switzerland, our dataset covers the period from the fourth quarter of 1995 to the first quarter of 2008.

We are ultimately interested in the behavioral responses to the Savings Directive and therefore construct a measure that matches the tax base of the source tax as closely as possible. The dataset contains breakdowns of bank liabilities on: (i) residence countries of counterparts; (ii) bank and non-bank counterparts, (iii) deposits and other liabilities, (iv) currency denomination. Exploiting (i)-(iii), we define DEP_{bst} as the USD value of deposits held by the non-bank sector in country s in banks in country b at time t. The measure excludes other liabilities than deposits since income from the corresponding assets may not qualify as interest under the Savings Directive and inter-bank deposits since the source tax only applies to interest income earned by individuals. For ease of reference, we shall simply use the term 'foreign deposits' for the deposits type of liabilities measured by DEP_{bst}.[6]

The sectoral breakdown does not allow for a distinction between subgroups within the non-bank sector, hence DEP_{bst} has the undesirable feature that it includes deposits owned by firms. In the case of Switzerland, there is reason to believe that foreign deposits are owned predominantly by individuals suggesting that the latter issue is of minor importance: The extraordinarily large stocks of foreign deposits attracted by Swiss banks (documented below) strongly indicates that the bulk of these deposits are driven by tax evasion. However, the use of Swiss bank accounts to evade taxes on interest income is much less straightforward for firms than for individuals because financial transactions are reflected in accounts that need the approval of an external auditor. In any case, to the extent that DEP_{bst} overstates the true value of deposits owned by individuals, it causes estimates of behavioral elasticities to be biased

[6] The bilateral deposit data used in this paper are not publicly available, however, deposit data aggregated over individual banking or saver countries are posted on the BIS website. More precisely, $\sum_s DEP_{bst}$ is available for each banking country b and $\sum_b DEP_{bst}$ is available for each saver country s. For Switzerland, some bilateral data are publicly available on the website of the Swiss central bank. Specifically, the Swiss central bank reports: (i) Ordinary deposits (on-balance sheet) held by foreign non-banks; (ii) Fiduciary liabilites (off-balance sheet) vis-a-vis foreign residents. These data are reported annually with end-of-year observations and with a breakdown on the country of residence of the counterpart. Although the BIS data for Switzerland and the data published by the Swiss central bank draw on the same underlying reports by individual banks, it is not possible to reconstruct the BIS data for Switzerland with the publicly available data from the Swiss central bank owing to the following three characteristics of the latter data: Firstly, the data are annual and not quarterly. Secondly, the data contain no breakdown of fiduciary liabilities on banks and non-banks nor on deposits and other liabilities. Thirdly, observations for some jurisdictions (most notably France) are missing until 2005. Despite these qualifications, it is possible to construct a (more noisy) measure of the tax base of the source tax by adding (i) and (ii). Footnote 13 reports results from an application of the empirical framework to this measure of foreign deposits in Swiss banks.

towards zero.

Table 1 lists the 20 jurisdictions with the largest stocks of foreign deposits prior to implementation of the Savings Directive. Not surprisingly, large OECD countries such as the UK, the US and Germany were in the top-5. A group of smaller countries, Switzerland, Luxembourg, Singapore, Belgium and Ireland, and a group of tax havens, the Cayman Islands, the Bahamas, Jersey, Guernsey and the Isle of Man, also attracted very considerable amounts of foreign deposits. Interestingly, the former group largely coincides with the group of countries providing a high level of legal protection to foreign tax evaders as identified above.

Figure 1 illustrates how stocks of foreign deposits in Swiss banks ('ALL') evolved over the sample period. Since the agreement between the EU and Switzerland on the Savings Directive was concluded toward the end of 2004, we consider 2004q4 a natural reference observation prior to which behavioral effects are unlikely to have occurred. We thus refer to observations before 2004q4 as 'pre-reform' and observations after 2004q4 as 'post-reform' and indicate the observation for 2004q4 with a vertical line in the figure. A simple comparison of pre-reform and post-reform time trends in foreign deposits does not reveal a negative effect of the source tax. On the contrary, the average annual growth rate in Swiss foreign deposits was considerably higher in post-reform years (9.3% in 2004-2006) than in pre-reform years (3.5% in 1996-2004).[7] Since the source tax only applies to EU residents and not to non-EU residents, it is natural to compare time trends for the two groups separately. To control for the changing composition of the EU, we depict Swiss deposits held by residents of the 15 EU member states as of the beginning of the sample period ('EU15') and Swiss deposits owned by residents of the non-EU member states as of the end of the sample period ('NON-EU'). In pre-reform years (1996-2004), the average annual growth of Swiss deposits owned by EU residents and non-EU residents were roughly similar (2.3% vs. 4.2%). Moreover, the simple correlation between quarterly growth rates for EU15 and NON-EU in the period 1995q4 to 2004q4 was 0.66 providing some evidence of an underlying common trend in Swiss deposits for the two groups. Coinciding with the introduction of the source tax, there was a remarkable divergence in trends for EU residents and non-EU residents as evidenced by very dissimilar average annual growth rates (-9.1% vs. 19.2%) in post-reform years (2004-2006).

4 Empirical strategy

The empirical strategy exploits that the Savings Directive changed the tax environment of EU residents with Swiss deposits while leaving non-EU residents with Swiss deposits unaffected. This allows us to apply a natural experiment methodology where the post-reform behavior of non-EU residents is used to proxy for the counterfactual post-reform behavior of EU residents in the absence of the Savings Directive. A key assumption in this type of framework is the *ex ante* comparability of control group and treatment group. While EU residents and non-EU residents differ in many respects, some of which we shall attempt

[7] To smooth seasonal and random variation in the deposit variable over quarters, average annual growth rates are computed as growth rates in annual average levels.

to control for in the robustness checks, a crucial advantage of the Swiss institutional environment is the universality of the legal provisions protecting foreign tax evaders. The bilateral tax treaties concluded by Switzerland include only very minor concessions, hence the (very limited) legal basis for provision of information to foreign tax administrations derives from Swiss domestic law, which applies universally to all foreigners regardless of their country of residence.

The empirical model simply estimates fully flexible time trends for deposits owned by EU residents and non-EU residents respectively and any divergence in the two trends around the time the Savings Directive was implemented is interpreted as a causal effect of the source tax. Essentially, this is an extended version of the canonical two-period difference-in-differences model. The empirical model thus looks in the following way:

$$\log(DEP_{st}) = \alpha + \sum \beta_s D_s + \sum \gamma_t D_t + \sum \lambda_t D_t \times D_{EU} + \varepsilon_{st}$$

where D_s is a set of country specific dummies, D_t is a set of time dummies and D_{EU} is a dummy taking the value one when s is an EU member state and zero otherwise. In the central regressions, we focus on Swiss deposits, hence $DEP_{st} = DEP_{bst}$ for observations with $b =$ Switzerland.

The timing of the negotiations and the implementation of the Savings Directive is crucial for the interpretation of the estimates. The source tax applies to interest income earned as from 1 July 2005. In order to avoid the source tax, EU residents with Swiss bank deposits therefore needed to adopt an avoidance strategy on 30 June 2005 or before. Since the bilateral agreements with Switzerland were concluded in late 2004, we assume that anticipatory responses largely occurred after 31 December 2004 and eliminate the time dummy for 2004q4, which becomes the reference quarter of the regression. To the extent that tax evaders were unaware of the Savings Directive prior to implementation, we should expect additional learning responses after 1 July 2005 as tax evaders received bank statements showing that interest income accruing to Swiss bank accounts had been subject to a withholding tax.

The estimated treatment effect for a given post-reform quarter t is captured by $\widehat{\lambda}_t$. It is easy to see that $\widehat{\lambda}_t$ is a difference-in-difference estimator since it expresses the growth in Swiss deposits held by EU residents since 2004q4 over and above the growth in Swiss deposits held by non-EU residents since 2004q4. The interpretation of $\widehat{\lambda}_t$ as the causal effect of the source tax rests on the identifying assumption that the value of Swiss deposits held by EU residents and non-EU residents respectively would have followed identical growth paths after 2004q4 in the absence of the Savings Directive, or equivalently, that estimating the model in a counterfactual world without the source tax would have yielded zero-estimates of λ_t for post-reform quarters. There is no rigorous way to test this identifying assumption. However, it seems natural to use information from pre-reform quarters to assess its validity. In order for the identifying assumption that the value of Swiss deposits of EU residents and non-EU residents would have followed identical growth paths after 2004q4 in the absence of the Savings Directive to be credible, they should follow roughly similar growth paths until 2004q4. This implies that the estimates of λ_t should generally be small and statistically insignificant for pre-reform quarters.

Even when the requirement of similar deposit growth paths in pre-reform years is satisfied, it is a

cause of concern that divergence in deposit growth paths in post-reform years could be caused by a shock, which coincided with implementation of the Savings Directive and affected treatment and control groups differently. Clearly, this would invalidate the identifying assumption since the effects of such a shock would wrongly be attributed to the source tax. The most obvious shocks to take into account are the enlargements of the European Union. On 1 May 2004 and 1 January 2007, a total of 12 countries entered the EU raising the number of member states from 15 to 27.[8] Importantly, the new member states adopted the entire complex of bilateral agreements between the EU and Switzerland including free trade agreements and agreements on the free movement of persons and capital. It is very plausible that these agreements had a strong independent effect on the value of Swiss bank deposits held by residents of the accession countries, which the reduced form model does not allow us to disentangle from the effect of the Savings Directive. Most regressions therefore exclude the 12 accession countries from the sample and the treatment group reduces to the 15 original EU countries ('EU15'). For the sake of completeness, separate results for the 10 countries joining the EU in 2004 ('NEW10') are also presented despite the ambiguity concerning the interpretation of these results.

In the baseline regressions, the control group includes all jurisdictions where tax evaders were unaffected by the source tax throughout the period of analysis, that is all jurisdictions except the 27 current EU countries ('NON-EU'). We also consider a number of different subsamples, each of which excludes certain jurisdictions in order to enhance comparability between treatment and control groups in a specific dimension. Firstly, we estimate the model with a control group that includes only OECD countries ('OECD'). Arguably, this reduces the risk that an asymmetric shock coinciding with the implementation of the Savings Directive and affecting industrialized and developing countries differentially invalidates the identifying assumption. Secondly, we use a control group that excludes offshore financial centers ('non-OFC'). This addresses the concern that transfer of formal ownership of Swiss deposits to offshore trusts, an avoidance technique discussed above, may have increased observed stocks of Swiss deposits held by residents of offshore financial centers. Finally, we use a control group that excludes countries with a high share of GDP deriving from resource rents ('non-RES'). This reduces the risk that the rapid surge in commodity prices during the period 2004-2007 affected the relative size of Swiss deposits held by EU residents and non-EU residents in the control group.

Exchange rate fluctuations deserve particular attention since they mechanically affect the USD equivalent value of bank deposits denominated in other currencies. In particular, a depreciation (appreciation) of USD against other currencies mechanically increases (decreases) the USD equivalent of assets denominated in those other currencies. Since the currency denominations of Swiss deposits owned by EU residents and non-EU residents differed markedly, significant exchange rate changes around the time the Savings Directive was implemented would invalidate the identifying assumption. We exploit the currency breakdown of the deposit dataset to address this concern. Specifically, letting DEP_{sta} denote the USD value of Swiss deposits denominated in currency a owned by non-bank residents of country s at time t,

[8] Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia entered the EU on 1 May 2004 whereas Bulgaria and Romania became EU member states on 1 January 2007.

we run separate regressions with DEP_{sta} as dependent variable for each of the major currencies.

As a final note on the identification strategy, it should be emphasized that we rely crucially on the assumption that non-EU residents are unaffected by the Savings Directive. Although the provisions of the Savings Directive do not directly apply to non-EU residents, it cannot be excluded that non-EU residents are affected by general equilibrium effects. For instance, if the source tax induced EU residents to reduce their deposits in Swiss banks, the latter may have responded by raising deposit rates, which, in turn, may have affected stocks of foreign deposits. This particular possibility should not be a major concern, however, since indirect effects working through deposit rates presumably have the same impact on the treatment group and the control group thus leaving the difference-in-difference estimator unbiased. More generally, we expect general equilibrium effects to be small since deposits of EU residents constitute a negligible fraction of the total balance sheet of Swiss banks.[9]

The log-level formulation of the model implies that zero-observations are generally treated as missing. A common way to deal with this problem is to add a small number to the dependent variable before taking logarithms. In our context where parameters are identified by growth rates, however, this would introduce a potentially serious bias. Adding a positive number to a variable attenuates percentage changes in an asymmetric way in the sense that attenuation is stronger at low levels. Since the average level of DEP_{st} is significantly lower in the control group than in the treatment group, this procedure would thus manipulate growth rates in the dependent variable in a way that would be correlated with treatment. Noting that zero-observations constitute less than 7% of the observations in the full sample of Swiss bank deposits and even less in some subsamples, we generally allow zeroes to be treated as missing observations.[10]

We estimate the model using OLS. As forcefully argued by Bertrand, Duflo and Mullainathan (2004), OLS standard errors may seriously understate the true standard deviation of the estimated treatment effect in the presence of serial correlation. Arguably, the problem is less severe in the present case since there is time dummies on the right-hand side rather than a highly persistent treatment variable. We nevertheless follow the recommendation of Bertrand, Duflo and Mullainathan (2004) and present standard errors that are robust to serial correlation.[11]

5 Results

5.1 Main results

In the baseline regression, we estimate the model with a sample that includes all jurisdictions except the 12 countries entering the EU in 2004 and 2007. Effectively, this estimation uses the 15 EU member

[9] According to banking statistics reported by the Swiss central bank, liabilities in the form of deposits (on-balance sheet) vis-a-vis EU resident non-banks and fiduciary liabilities (off-balance sheet) vis-a-vis EU residents constituted around 0.5% and 1.6% respectively of the total balance of Swiss banks at the end of 2005 (due to missing data for France, these figures may not be computed for earlier years).

[10] For instance, there are no missing observations in the subsample of OECD countries

[11] This is implemented in Stata with the cluster command clustering on country of residence s.

states as of 1 January 2004 ('EU15') as treatment group and all other jurisdictions than the 27 EU member states as of 1 January 2007 ('NON-EU') as control group. The regression results are illustrated in figure 2 (numerical results in Appendix - panel A). The two lines in the figure represent the estimated trends in Swiss deposits held by EU15 and NON-EU respectively. The dashed vertical line indicates the reference quarter 2004q4. Under the identifying assumption that trends for EU15 and NON-EU would have followed the same paths absent the Savings Directive, the vertical distances between the two trend lines in post-reform quarters are the estimated treatment effects. The columns indicate the statistical significance levels (p-values) of the interaction terms $D_t \times D_{EU}$. The dashed horizontal line indicates the 5% significance level.

There is a remarkable similarity in trends for EU15 and NON-EU in pre-reform quarters followed by a striking divergence around the time the Savings Directive was implemented. Clear signs of divergence appear between observations 2005q1 and 2005q2 (i.e. between 31 March 2005 and 30 June 2005) where growth rates in the value of Swiss deposits were 3,4% and -13,5% for control group and treatment group respectively. Recalling that the source tax was introduced on 1 July 2005, we interpret this as an anticipatory behavioral effect. The strong divergence continues between observations 2005q2 and 2005q3 (i.e. between 30 June 2005 and 30 September 2005) with growth rates of 4,6% and -13,8% for NON-EU and EU15 respectively. This is probably best understood as a mix of anticipatory effects and learning effects. The source tax applies to interest income earned as from 1 July 2005, which implies that the tax cost of adopting an avoidance strategy shortly after this date was negligible. This suggests that some tax evaders anticipating the source tax might have adopted other evasion strategies shortly after 1 July 2005, which would be captured by the interaction term for 2005q3. In the subsequent four quarters (i.e. between 30 September 2005 and 30 September 2006), the average quarterly growth rate in the value of Swiss deposits was markedly lower for EU15 than for the NON-EU. We interpret this as a learning effect in the sense that tax evaders with Swiss deposits adopted other evasion strategies after learning about the withholding tax on Swiss source interest income through bank statements or otherwise. In the remaining quarters, growth rates for NON-EU and EU15 were roughly similar. As indicated by the columns in the figure, interaction terms are clearly insignificant for all quarters up to 2005q1 and highly statistically significant for all quarters as from 2005q2 supporting the visual impression that NON-EU and EU15 followed similar paths until 2005q1 and then diverged sharply.

Estimates of the treatment effect in this specification are summarized in the first column of table 2. The choice of an appropriate time window for evaluating treatment effects is associated with the usual trade-off: A shorter window increases the risk that the estimated treatment effect does not capture all behavioral responses whereas a longer window increases the risk that the estimated treatment effect includes the effects of other shocks. In light of this trade-off, we report treatment effects for time windows of different length: The treatment effect evaluated at the end of 2005q3 is around 33%.[12] Essentially, this estimate only reflects behavioral responses taking place during the quarter immediately before and the

[12] The treatment effect for period t is computed as $\exp(0) - \exp(\widehat{\lambda}_t)$ for post-STD values of t where 0 under the identifying assumption is the expected, counterfactual value of $\widehat{\lambda}_t$ absent the STD.

quarter immediately after the implementation date and thus represents a conservative estimate, which is very unlikely to be contaminated by other events. Extending the time window by another four quarters to the end of 2006q3 yields an estimate of the treatment effect of around 44%. By covering a period where most holders of Swiss bank deposits received bank statements indicating that a withholding tax had been levied on their interest income, this estimate presumably picks up additional learning effects. Averaging treatment effects over the four quarters of 2006 gives rise to an estimated treatment effect of 41.6%. Since the latter estimate is smoothing seasonal and random variation in deposits over quarters, it represents our preferred estimate of the treatment effect.[13]

We also estimate the model using the 10 countries that entered the EU on 1 May 2004 ('NEW10') as treatment group and NON-EU as control group. As discussed earlier, the legal complex adopted by accession countries included bilateral agreements with Switzerland eliminating barriers to the free movement of goods, persons and capital, which presumably had a strong positive effect on Swiss bank deposits owned by residents of these countries. Since the bilateral agreements came into force shortly before we would expect anticipatory responses to the Savings Directive, the regression results should be interpreted with caution.

The results are illustrated in figure 3 (numerical results in Appendix - panel B). Time trends for NON-EU and NEW10 are fairly similar from 2000 through 2004 and relatively clear signs of divergence appear around the time the Savings Directive was implemented. Between observations 2005q1 and 2005q3 (i.e. between 31 March 2005 and 30 September 2005), growth rates in the value of Swiss deposits were 8,2% and -12,1% for NON-EU and NEW10 respectively. Supporting this interpretation of the figure, interaction terms for all quarters from 2000q1 through 2004q4 are clearly insignificant whereas interaction terms for 2005q3-2006q1 are negative and statistically significant. After 2005q4, the average growth rate in the value of Swiss deposits is higher for NEW10 than for NON_EU and the two time trends converge again. Interaction terms for all quarters as from 2006q2 are statistically insignificant.

Since the identifying assumption that time trends for NON-EU and NEW10 would have been similar absent the Savings Directive is not credible in light of the almost simultaneous adoption of bilateral agreements with a potentially large impact on Swiss deposits, we refrain from interpreting coefficients on interaction terms as causal effects of the source tax. It is reassuring, however, that in the short time window where we should expect behavioral responses to the source tax to be strongest, the divergence in time trends for NON-EU and NEW10 is statistically significant and not much smaller than the divergence in the time trends for NON-EU and EU15.

[13] Estimating the model with the publicly available data from the website of the Swiss Central Bank described in footnote 6 yields very similar results. The data are end-of year and cover the period 2002-2008. We let 2004 be the reference year and omit time dummies for this year. In line with the reported results for the baseline model, the interaction terms for 2002 and 2003 are statistically insignificant whereas interaction terms for 2005, 2006, 2007 and 2008 are statistically significant at the 1% level with implied treatment effects in the range -44% to -37%.

5.2 Robustness checks

As a first robustness check of the large treatment effects found for the treatment group EU15, we estimate the model with a control group that only includes OECD member states ('OECD'). This reduces the size of the control group from 177 countries to 10 countries, however, arguably increases the comparability between treatment and control groups by excluding developing countries from the sample. The results are illustrated in figure 4 (numerical results in Appendix - panel C). Somewhat surprisingly in light of the very considerable reduction in sample size, the results are almost identical to the baseline results. As reported in the second column of table 2, the implied treatment effects are 36.3% and 44.8% when evaluating at the end of 2005q3 and 2006q3 respectively and 41.1% when averaging over the four quarters of 2006.

We also estimate the model with Swiss deposits denominated in each of the four major currencies EUR, USD, CHF and GBP separately.[14] As noted earlier, exchange rate fluctuations mechanically affect the USD equivalent value of bank deposits in other currencies. Since the currency composition of Swiss deposits differed considerably between EU residents and non-EU residents, significant exchange rate changes around the time the Savings Directive was implemented could potentially invalidate our identifying assumption. Under the assumption that there were no behavioral responses to the source tax and the treatment effects estimated in the baseline model exclusively reflect exchange rate movements, we should find zero treatment effects in the currency specific regressions. Under the alternative assumption that the treatment effects estimated in the baseline model reflect true behavioral responses, we should find negative treatment effects in at least some of the currency specific regressions and, moreover, the weighted average of these currency specific treatment effects should be roughly identical to the baseline treatment effect when weights equal the currency shares in the total value of Swiss deposits owned by EU residents. The results are illustrated in figure 5a-5d (numerical results in Appendix - panel D-G). Although patterns differ across currencies, the trends for EU15 and NON-EU clearly diverge around 2005q2-2005q3 for all four currencies. As reported in table 2, the implied treatment effects range from -20.5% (CHF) to -44.7% (GBP) when evaluated at the end of 2005q3 and from -25.8% (CHF) to -56.9% (GBP) when evaluated at the end of 2006q3. Table 2 also displays weighted averages of the currency specific treatment effects using currency shares in Swiss deposits owned by EU residents as of 2004q4 as weights. The weighted averages are remarkably similar to the treatment effects from the baseline regression suggesting that the latter results are not to any significant extent driven by exchange rate movements.

Turning to a caveat related to the notion of compositional change, we recall that transferring the formal ownership of interest bearing assets to a trust located in a jurisdiction not covered by the Savings Directive allows EU residents to escape the source tax. The use of this particular avoidance technique poses a threat to our identification strategy since it translates into a drop in foreign deposits held by EU

[14] In 2004q4, more than 95% of Swiss deposits were denominated in one of these four currencies. Not surprisingly, there were substantial differences in the currency composition between EU15 (EUR: 46%; USD: 26%; CHF: 16%; GBP: 9%) and NON-EU (EUR: 20%; USD: 62%; CHF: 6%, GBP: 8%).

residents and an increase in foreign deposits held by non-EU residents, the latter causing the difference-in-differences estimators to suffer from an upward bias. In an attempt to address this concern, we identify the jurisdictions most likely to host trust business and construct a modified control group that excludes these jurisdictions. Due to recent legislative innovation, most of the global trust business is now located in offshore jurisdictions.[15] We thus estimate the model with an alternative control group that excludes 46 offshore financial centers ('NON-OFC') as classified by the IMF (Zorome, 2007). As reported in table 2, implied treatment effects with control group NON-OFC are only slightly smaller than the baseline results.[16]

A specific shock to the world economy more or less coinciding with the implementation of the Savings Directive was a rapid surge of commodity prices.[17] Since EU countries are net importers and non-EU countries are net exporters of primary commodities, there is a risk that the commodity price boom had an independent effect on the size of foreign assets held by EU residents relative to the size of foreign assets held by non-EU residents, which could potentially invalidate our identifying assumption. To address this concern, we use data from the World Development Indicators database on the value of rents associated with extraction of fossil fuels and minerals to construct a control group that excludes countries with a high share of GDP deriving from resource rents ('NON-RES'). Specifically, we estimate the model with a sample that excludes 21 countries where resource rents accounted for more than 30% of GDP in 2004. As reported in table 2, treatment effects with control group NON-RES are almost identical to the baseline results.

We conduct two final robustness checks with the Swiss deposit data. As discussed earlier, the log-level formulation of the model implies that zero-observations are treated as missing. To make sure that our results are not driven by changes in the composition of the sample, we carry out robustness checks where a balanced sample property is imposed by excluding jurisdictions with at least one zero-observation from the sample. Moreover, the fact that DEP_{bst} is reported in integer number of USD millions introduces some measurement error, which is particularly pronounced for country pairs where the level of DEP_{bst} is low. There is *a priori* no reason to believe that this type of measurement error should be correlated with treatment and rounding should therefore not bias our estimates. As a crude test of whether observations with potentially large measurement errors influence the results, we estimate the model with a control group that excludes countries for which stocks of Swiss deposits take values below 10 million dollars in any quarter during the sample period. As reported in table 2, implied treatment effects are almost identical to the baseline estimates.

[15] Lorenzetti (1997) argues that offshore trusts have two main advantages over onshore alternatives. Firstly, they offer better asset protection from the claims of creditors (e.g. tax administrations). Secondly, they allow the settlor to retain a large degree of control over assets even in the case of discretionary trusts.

[16] Due to space constraints, we do not list numerical results for this regression and the following robustness checks but simply report implied treatment effects.

[17] According to the IMF Primary Commodity Price Index, average commodity prices more than doubled from 2004 to 2008.

5.3 Other banking jurisdictions

As a final robustness check, we apply the same empirical framework to a handful of other banking jurisdictions. Although in principle our methodology is applicable to any banking jurisdiction for which bilateral deposit data is available, we limit the analysis to jurisdictions where there are strong *a priori* reasons to believe that a large fraction of foreign deposits is owned by tax evaders. In such jurisdictions behavioral responses by tax evaders translate into relatively large and detectable changes in DEP_{st} whereas in jurisdictions where foreign tax evaders account for a small fraction of total foreign deposits even considerable behavioral responses to the Savings Directive cause relatively little and hardly detectable variation in DEP_{st}. In other words, since we are unable to distinguish deposits owned by evaders and non-evaders in the data, analyzing jurisdictions that attract many tax motivated deposits increases the statistical power of the tests. Moreover, only in cases where we have strong priors that a large fraction of total deposits is owned by tax evaders, it is natural to interpret the estimated tax elasticity of DEP_{st} as an approximation to the theoretically relevant evasion elasticity.

We thus limit the analysis to Luxembourg, Jersey, Guernsey and the Isle of Man. These jurisdictions are small, attract large amounts of foreign deposits and have legal institutions providing foreign tax evaders with a high level of protection against detection. In combination, these characteristics suggest that most foreign deposits are owned by tax evaders.[18] For each of the four banking jurisdictions, we estimate the model using EU15 as treatment group and NON-EU and OECD as control groups in two separate regressions. For Luxembourg, deposit data are available from 1995q4 through 2008q1 whereas deposit data for Jersey, Guernsey and the Isle of Man were first reported for 2001q4.

Firstly, we consider Luxembourg. The regression results with control group NON-EU are illustrated in figure 6 (numerical results in Appendix - panel I). There are some signs of divergence around the time the Savings Directive was implemented. Specifically, between observations 2005q1 and 2005q4 (i.e. between 31 March 2005 and 31 December 2005), growth rates in the value of Luxembourg deposits were 1,6% and -16,1% for NON-EU and EU15 respectively. Interaction terms in post-reform quarters, however, are in most cases statistically insignificant. The regression results with control group OECD are illustrated in figure 7 (numerical results in Appendix - panel J). In the same three quarters 2005q1-2005q4, the growth rate was 35,4% for OECD suggesting a much larger treatment effect than when using the control group NON-EU. It should be noted, however, that average growth rates in Luxembourg deposits during the years prior to implementation of the Savings Directive were considerably higher for OECD than for EU15, which casts some doubt on the identifying assumption of similar growth rates in post-reform quarters absent the Savings Directive. Moreover, coefficients have large standard errors and interaction terms in post-reform quarters are not consistently significant at the 5% level. In table 3, we report the estimated treatment effects in Luxembourg for different time windows. Treatment effects are in the range -15% to -9% when using NON-EU as control group and in the range -32% to -26% when using OECD as control group.

[18] It would have been natural to include the Cayman Islands and the Bahamas in the analysis, however, our dataset does not contain bilateral deposit data for these jurisdictions.

Secondly, we consider Jersey. The regression results are illustrated in figure 8-9 (numerical results in Appendix - panel K-L). In both figures, there are strong signs of divergence between observations 2005q1 and 2005q3 (i.e. between 31 March 2005 and 30 September 2005). A peculiar feature of the trend line for EU15 is the spikes in 2006q2 and 2007q4. Both spikes are due to sudden increases in Jersey deposits from a few jurisdictions (i.e. Germany, Belgium and Luxembourg) followed by a decrease of a similar magnitude in the next quarter. In terms of statistical significance, we note that interaction terms for all quarters after 2005q2 (except the two quarters with spikes) are highly significant. Estimated treatment effects for Jersey are reported in table 3 and fall in the range -30% to -16% for control group NON-EU and -32% to -22% for control group OECD.

Thirdly, we consider Guernsey. We illustrate the results in figure 10-11 (numerical results in Appendix - panel M-N). Both figures display relatively strong signs of divergence between observations 2005q1 and 2005q4. However, average growth rates in Guernsey deposits prior to implementation of the Savings Directive were considerably lower for NON-EU than for EU15 making the identifying assumption somewhat less credible in the former of these regressions. Estimated treatment effects for Jersey are reported in table 3 and are in the range -24% to -19% for control group NON-EU and -29% to -12% for control group OECD.

Finally, we turn to the Isle of Man. The results are illustrated in figure 12-13 (numerical results in Appendix - panel O-P). In both figures, there are relatively strong signs of divergence between observations 2005q1 and 2005q4. The spike in the trend line for OECD is due to a sudden decrease in Swiss owned deposits on the Isle of Man between 2006q2 and 2006q3 followed by an increase of a similar magnitude in the next quarter. As reported in table 3, treatment effects are in the range -37% to -28% when using NON-EU as control group and in the range -22% to 15% (the spike) when using OECD as control group.

6 Policy implications

In this section, we develop a simple framework for analyzing the efficiency properties of tax policies when agents have access to multiple tax evasion strategies. Subsequently, we apply the framework to the source tax introduced by the Savings Directive.

6.1 A simple model with multiple evasion strategies

We consider an economy comprising a large number of agents with different endowments of wealth s. We let $\mathbb{N}$ denote the set of available investment strategies and $\mathbb{Z}$ the subset of evasion strategies. We assume that investment strategy n is characterized by a rate of return r_n, a tax rate t_n and a fixed investment cost p_n that differs across agents.[19] Investment costs capture all costs related to the investment, e.g.

[19] Technically, the role of the assumption of fixed investment costs is to ensure that optimal portfolios of individual agents are non-diversified. This would also hold under the less restrictive assumption of a cost function $c_n(q_n)$ satisfying $c_n' \geq 0$ and $c_n'' \leq 0$ where q_n is the amount allocated to strategy n. The non-diversification property is necessary to

fees paid to banks and financial intermediaries, information costs and concealment costs in the case of evasion strategies. Each agent is thus characterized by a wealth endowment s and a vector of investment costs $\mathbf{p} = (p_1, p_2, ..., p_N)$. The joint distribution of these characteristics is described by the joint density function $f(s, \mathbf{p})$. Vectors $\mathbf{r} = (r_1, r_2 ... r_N)$ and $\mathbf{t} = (t_1, t_2 ... t_N)$ summarize the return structure and tax rates respectively. Tax rates associated with evasion strategies $z \in \mathbb{Z}$ are zero.

Agents have preferences over individual and government consumption. Preferences are represented by the utility function $u(c, R)$ where c is individual disposable income and R is government revenue. Individual disposable income amounts to investment income net of taxes and investment costs, hence the disposable income of an agent with characteristics $(s, \mathbf{p})$ choosing strategy n is given by $c = s(1 - t_n)r_n - p_n$. Since R is perceived as fixed by individual agents, utility maximization is equivalent to maximization of c. The assumptions of a constant net-of-tax marginal return and fixed investment costs imply that agents optimally allocate their wealth to a single investment strategy.

Turning to government revenue, it is useful to define $\theta_n(\mathbf{r}, \mathbf{t})$ as the fraction of aggregate wealth allocated to investment strategy n in an environment characterized by $(\mathbf{r}, \mathbf{t})$. Clearly, it must hold that $\partial\theta_n/\partial t_n \leq 0$ and $\partial\theta_m/\partial t_n \geq 0$ for $m \neq n$. Intuitively, an increase in t_n makes strategy n less attractive relative to any alternative strategy m and may induce substitution from strategy n to other strategies whereas changes in t_n have no bearing on the choice between two alternative strategies. Using the definition of $\theta(\cdot)$, the government revenue may be written as $R = \sum_n \theta_n r_n t_n S$ where S refers to aggregate wealth.

Within this framework, we consider a case where the government is able to raise the effective tax rate associated with a particular evasion strategy z above zero. This corresponds to the source tax introduced by the Savings Directive, which enables EU governments to effectively tax interest income earned by tax evaders in Switzerland and a number of other non-cooperative jurisdictions. To determine the efficiency properties of the source tax, we compute the effect of a marginal change in t_z on aggregate disposable income C and government revenue R.

$$\frac{\partial C}{\partial t_z} = -\theta_z r_z S$$

$$\frac{\partial R}{\partial t_z} = \theta_z r_z S + \sum_n \frac{\partial \theta_n}{\partial t_z} r_n t_n S$$

To derive $\partial C/\partial t_z$ we have applied the general result that behavioral responses to a marginal policy change have no effect on individual utility if agents have initially optimized.[20] Intuitively, marginal tax changes only affect the optimal investment strategy of agents that are marginal in the sense that they

ensure that $\partial\theta_n/\partial t_z \geq 0$ for $n \neq z$, which implies that the total revenue effect of an increase in t_z is given by substitution from strategy z to other strategies. If portfolios were diversified, an increase in t_z could trigger substitution between two alternative strategies n and m with potential implications for government revenue. This would make it difficult to interpret the empirical results in light of the model, since we are able to estimate $\partial\theta_z/\partial t_z$ but not $\partial\theta_n/\partial t_z$ and $\partial\theta_m/\partial t_z$.

[20] To apply the general result, it is implicitly assumed that the investment costs are real resource costs. In a recent paper, Chetty (2009) argues that costs related to tax planning contain an element of transfer to other agents, in which case $\partial C/\partial t_z$ overestimates the change in private consumption following a tax change and $-dC/dR$ overestimates the marginal cost of public funds associated with the source tax.

are initially indifferent between the chosen strategy and some other strategy. This implies that whereas a marginal increase in t_z has a negative mechanical effect on C holding strategy choices fixed, behavioral responses in the form of strategy changes have no impact on C. Behavioral responses may, however, have an impact on government revenue because investment strategies that are associated with the same private return c may give rise to different tax payments. The revenue effect of the behavioral responses is captured by the summation term in $\partial R/\partial t_z$.

Using $\partial C/\partial t_z$ and $\partial R/\partial t_z$, it is easy to derive the following expression for the marginal cost of public funds associated with t_z, which summarizes the efficiency properties of the tax instrument:

$$\left\{-\frac{dC}{dR}|t_z\right\} = \frac{1}{1+\sum_n \frac{\partial \theta_n}{\partial t_z}\frac{(r_n t_n - r_z t_z)}{\theta_z r_z}}$$

The first term of the denominator represents the mechanical increase in government revenue following a marginal increase in t_z. The remaining terms of the denominator capture the effect on government revenue of behavioral responses by individual agents. Substitution from strategy z towards strategy n increases (reduces) government revenue to the extent that the tax bill $r_n t_n$ associated with strategy n is larger (smaller) than the tax bill $r_z t_z$ associated with strategy z. Invoking a standard argument, the marginal effect on government revenue of behavioral responses exactly equals the marginal deadweight loss of taxation. The marginal deadweight loss associated with increases in t_z may thus be either positive if behavioral responses primarily reflect increases in compliance or negative if behavioral responses mainly reflect substitution towards other evasion strategies with zero tax rates.

6.2 Optimal policy

While the empirical analysis provides an estimate of the total reduction in Swiss deposits held by EU residents caused by the source tax, it does not allow us to break down this total behavioral effect on increased compliance and substitution towards alternative evasion strategies. There are important reasons to believe, however, that the reduction in Swiss deposits was not driven by increased compliance. Firstly, most EU countries apply a tax rate on capital income that by far exceeds the 15% tax on Swiss source interest income introduced by the Savings Directive. From the perspective of tax evaders, maintaining a Swiss bank account thus clearly dominated compliance in terms of tax costs. Secondly, since the Savings Directive did not include an amnesty clause, choosing to disclose funds for tax purposes would entail a substantial risk of legal sanctions relating to tax evasion in previous years. Finally, as pointed out by the European Commission (2008), other evasion strategies were readily available in the form of bank deposits in non-cooperating tax havens, evasion structures allowing tax evaders to retain Swiss bank deposits while falling outside the scope of the Savings Directive and asset types generating income not subject to the source tax. This is consistent with the empirical finding of Klautke and Weichenreider (2008) that a specific class of bonds, which is exempt from the source tax, is not associated with a lower pre-tax return than classes of otherwise comparable taxable bonds.

Together, these three arguments make a strong case for assuming that the behavioral responses estimated above reflect substitution towards other evasion strategies rather than increased compliance

or, in terms of the model, that $\partial\theta_n/\partial t_z = 0$ for $n \notin \mathbb{Z}$. Under this assumption $-dC/dR$ simplifies in the following way:

$$\left\{-\frac{dC}{dR}|t_z\right\} \simeq \frac{1}{1-\varepsilon_z \frac{t_z}{(1-t_z)}}$$

where ε_z is the elasticity of θ_z with respect to the net-of-tax rate $(1-t_z)$. The fact that ε_z is sufficient to compute the efficiency properties of the source tax mirrors the finding of Feldstein (1999) that the tax elasticity of the tax base is sufficient to compute the deadweight loss of taxation. Essentially, the assumption that behavioral responses only reflect substitution towards other evasion strategies imposes that behavioral effects do not affect other tax bases as discussed by Slemrod (1998).

Our preferred estimate of the reduction in Swiss deposits caused by the Savings Directive is around 42%. The 15% source tax reduced the net-of-tax rate from 1 to 0.85, hence the implied elasticity of Swiss bank deposits with respect to the net-of-tax rate is around 2.75. Assuming that our empirical measure of Swiss deposits only covers deposits held by individual tax evaders, this elasticity corresponds directly to ε_z where evasion strategy z is the use of Swiss bank deposits. To the extent that our empirical measure of Swiss deposits also includes other types of deposits, the relevant value of ε_z is higher. Assuming, for instance, that 20% of the deposits captured by the empirical deposit measure were held by firms and non-evading individuals, both groups that were unaffected by the source tax, the estimated reduction in total Swiss deposits of around 42% corresponds to a reduction in deposits owned by individual tax evaders of around 52% implying a value of ε_z around 3.5. In other words, the fact that our empirical measure of Swiss deposits is broader than the tax base to which the source tax applies means that the elasticity of 2.75 is a lower bound for the true value of ε_z.

Inserting the conservative elasticity estimate of 2.75 into the simplified expression for $-dC/dR$, it is easy to compute the marginal cost of public funds evaluated at different source tax rates. At the rate of 0%, the marginal cost of public funds is exactly 1. This reflects that the marginal deadweight loss is zero because substitution from an untaxed investment strategy towards other untaxed investment strategies does not create a revenue loss. At the rate of 15% applicable at the time of implementation, the marginal cost of public funds is close to 2. Under the assumption that the evasion elasticity of 2.75 also applies outside the range of tax rates 0%-15% for which it is estimated, the marginal cost of funds at the current rate of 20% exceeds 3. The latter estimate is high compared to standard estimates of the marginal cost of funds associated with other sources of government revenue. For instance, Kleven and Kreiner (2006) compute the marginal cost of public funds associated with proportional changes in the income tax for five representative EU countries under different assumptions about labor supply elasticities and report estimates in the range 0.8-3.5. Conversely, assuming that the marginal cost of public funds associated with other sources of revenue is around 1.5, which is close to the average benchmark estimate for the four largest EU countries, France, Germany, Italy and the UK, reported by Kleven and Kreiner (2006), the optimal source tax on Swiss source interest income is around 10%.

Although the use of relatively inefficient tax instruments may be justified if the burden is on tax evaders and such individuals have little or no weight in the social welfare function, tax instruments should not be used beyond their revenue maximizing tax rate. In this sense, the revenue maximizing

tax rate constitutes an important benchmark as the highest possible optimal rate. We compute the revenue maximizing value of t_z as the rate at which the denominator of $-dC/dR$ is zero, that is where the marginal 'behavioral' revenue effect and the marginal 'mechanical' revenue effect exactly offset each other:

$$t_z^* = \frac{1}{1+\varepsilon_z}$$

Evaluated at our preferred elasticity estimate of 2.75, the revenue maximizing rate is around 27%. This suggests that the rate of 35% applicable as from 2011 is suboptimally high even if no consideration is given to the utility of tax evaders.[21]

7 Concluding remarks

The main aim of the paper was to estimate the impact of the Savings Directive on Swiss bank deposits owned by EU residents. We found very robust results suggesting that the 15% source tax on interest income introduced by the Savings Directive caused Swiss bank deposits of EU residents to decrease by around 40% corresponding to an elasticity of deposits with respect to the net-of-tax rate in the range 2.5-3. We also presented less conclusive evidence suggesting somewhat smaller effects in Luxembourg, Jersey, Guernsey and the Isle of Man.

Moreover, we developed a simple theoretical framework that allowed us to analyze the policy implications of the empirical results. Under the assumption that the estimated decrease in Swiss deposits held by EU residents reflected substitution towards other evasion strategies rather than increased compliance, we found that the source tax is associated with a very considerable deadweight loss. Specifically, we found that the revenue maximizing tax rate is around 27% whereas the socially optimal tax rate may be much lower if tax evaders have some weight in the social welfare function. In any case, the source tax rate of 35% projected to apply as from 2011 appears to be suboptimally high.

In more general terms, our empirical analysis suggests a high degree of substitutability between different tax evasion strategies, which severely limits the scope for combating tax evasion with partial measures like the Savings Directive. Intuitively, when policy measures target a subset of available evasion strategies and leave a significant scope for substitution towards non-targeted evasion strategies, the optimal effective tax rate on targeted evasion strategies is low.

As is often the case with estimates of behavioral elasticities derived in non-structural frameworks, the question of external validity arises. Clearly, the extent to which tax evaders are able to circumvent measures against tax evasion depends partly on the degree of sophistication of tax evaders and partly on the particular design of the measures themselves, hence our sizable estimates of the responsiveness of tax evasion strategies do not necessarily carry over to other types of measures. In some dimensions, such as

[21] While plausibly the Savings Directive did not trigger significant repatriation of existing offshore bank deposits, it may have reduced new bank deposits in offshore juridictions. In other words, the source tax may have caused considerable revenue gains by deterring tax evasion. The static model presented in this section does not account for such dynamic gains. This tends to overestimate the marginal cost of public funds associated with the source tax and underestimate the revenue maximizing source tax rate.

the definition of interest income and the test of beneficial ownership, the scope of the Savings Directive is certainly narrow, which presumably increases the substitutability between targeted and non-targeted evasion strategies and depresses the optimal effective tax rate on targeted evasion strategies. On the other hand, the Savings Directive is a rare example of a truly multilateral reform comprising a large group of tax havens and other financial centers. Presumably, the behavioral responses of tax evaders to an otherwise similar bilateral reform would have been even larger since substitution towards bank deposits in non-targeted jurisdictions would have been easier.

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Appendix A - Tables and Figures

Table 1: Foreign deposits by banking jurisdiction in 2004 (USD billions)

United Kingdom	882,0
United States	514,6
Cayman Islands	475,9
Germany	400,1
Switzerland	331,0
Luxembourg	165,2
Belgium	158,2
Singapore	141,0
Spain	134,3
Jersey	114,6
Netherlands	113,4
Ireland	97,4
Bahamas	96,1
France	93,3
Hong Kong	73,5
Japan	61,8
Guernsey	43,1
Canada	36,6
Isle of Man	36,1
Italy	34,7
ALL	4224,9

Note: The annual level is computed as a simple average over quarters

Table 2: Estimated treatment effects for Switzerland

Treatment group	EU15	EU15	EU15	EU15	EU15	EU15	EU15	EU15	EU15	EU15	EU15
Control group	NON-EU	OECD	NON-EU	NON-EU	NON-EU	NON-EU	NON-EU	NON-OFC	NON-RES	BAL	10MIO
Currency denomination	ALL	ALL	EUR	USD	CHF	GBP	Average	ALL	ALL	ALL	ALL
Column	I	II	II	IV	V	VI	VII	VIII	IX	X	XI
Evaluation											
- 30 sepember 2005	-33,3%	-36,3%	-35,6%	-33,8%	-20,5%	-44,7%	-33,4%	-32,2%	-32,0%	-34,6%	-32,9%
- 30 sepember 2006	-44,3%	-44,8%	-42,0%	-51,6%	-25,8%	-56,9%	-43,2%	-42,1%	-43,6%	-42,7%	-42,6%
- average 2006	-41,6%	-41,1%	-42,5%	-48,2%	-22,9%	-55,6%	-41,9%	-39,8%	-40,8%	-40,9%	-40,0%

Table 3: Estimated treatment effects for Luxembourg, Jersey, Guernsey and the Isle of Man

Banking country	Luxembourg	Luxembourg	Jersey	Jersey	Guernsey	Guernsey	Isle of Man	Isle of Man
Treatment group	EU15	EU15	EU15	EU15	EU15	EU15	EU15	EU15
Control group	NON-EU	OECD	NON-EU	OECD	NON-EU	OECD	NON-EU	OECD
Currency denomination	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL
Column	I	II	III	IV	V	VI	I	II
Time window								
- 30 sepember 2005	-11,5%	-26,7%	-30,4%	-32,0%	-24,0%	-28,6%	-32,2%	-22,3%
- 30 sepember 2006	-14,9%	-31,7%	-28,3%	-31,0%	-21,0%	-12,4%	-27,9%	14,9%
- average 2006	-9,5%	-27,8%	-16,8%	-21,7%	-18,6%	-16,6%	-37,2%	-15,8%

Figure 1: Foreign deposits in Swiss banks

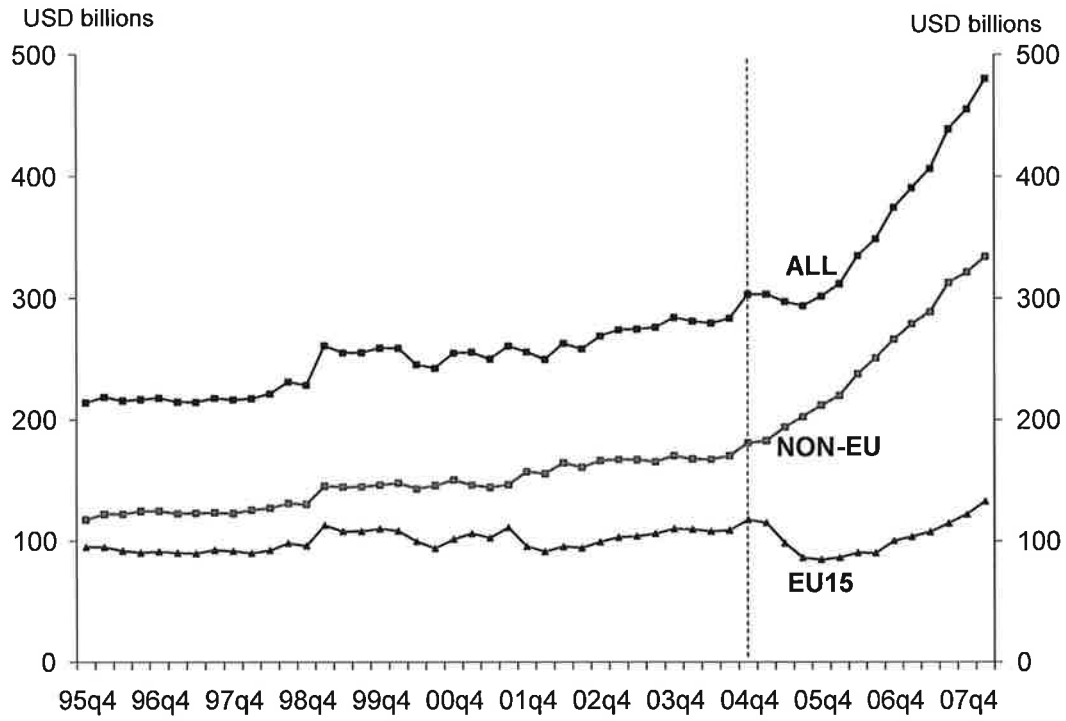
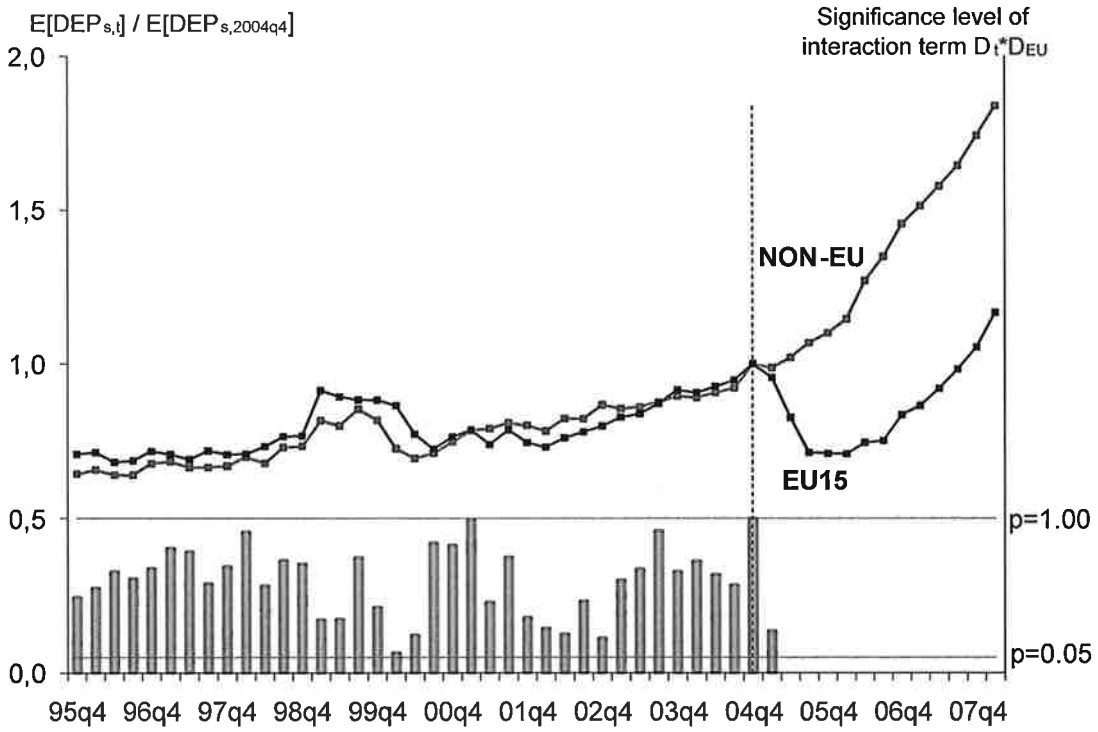
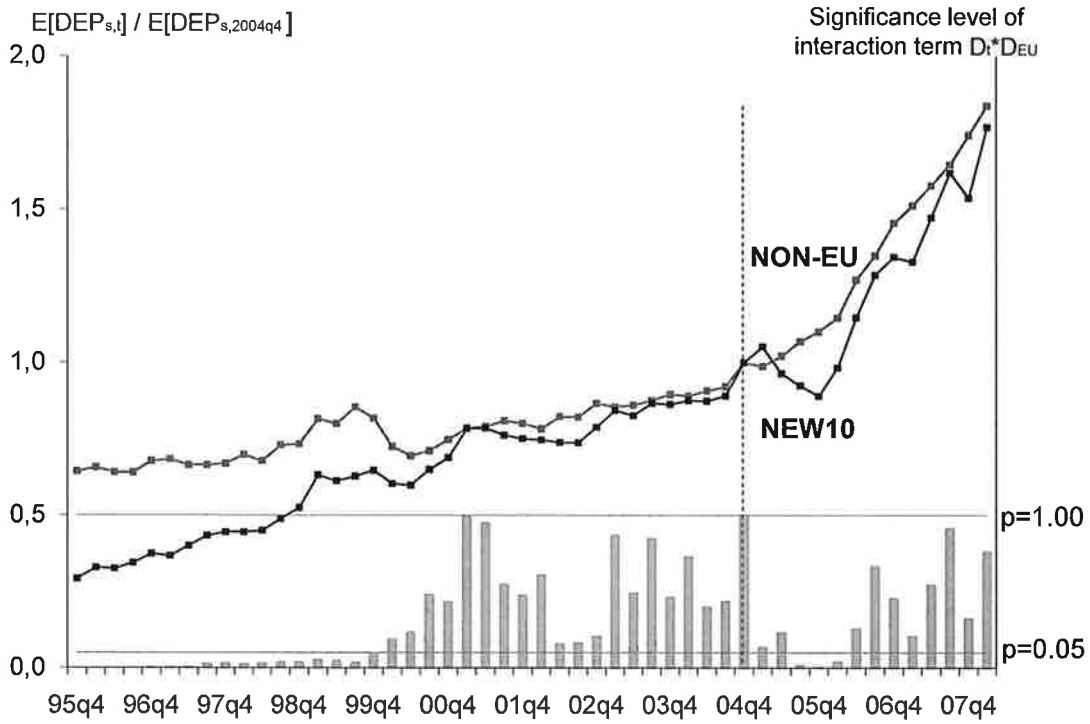


Figure 2: Swiss deposits, EU15 vs. NON-EU



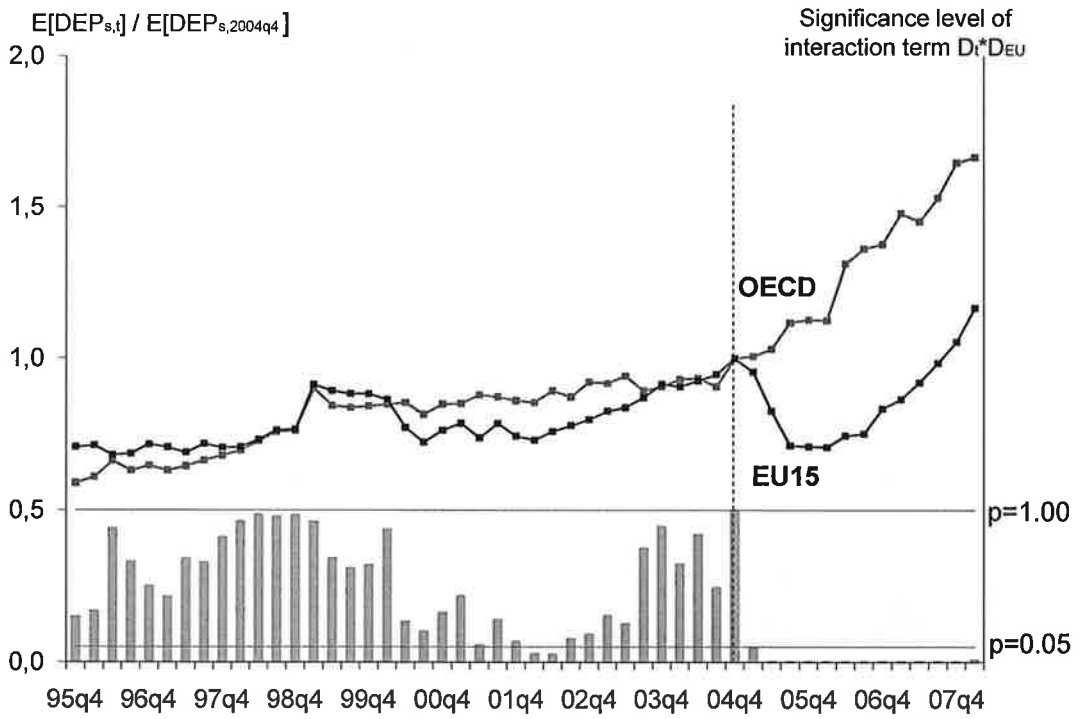
Note: Lines indicate trends in DEPs as captured by coefficients on time dummies Dt and interaction terms Dt*DEU, specifically exp(λt) for NON-EU and exp(λt+γt) for EU15 (left axis). Columns indicate statistical significance levels of interaction terms γtDEU (right axis).

Figure 3: Swiss deposits, NEW10 vs. NON-EU



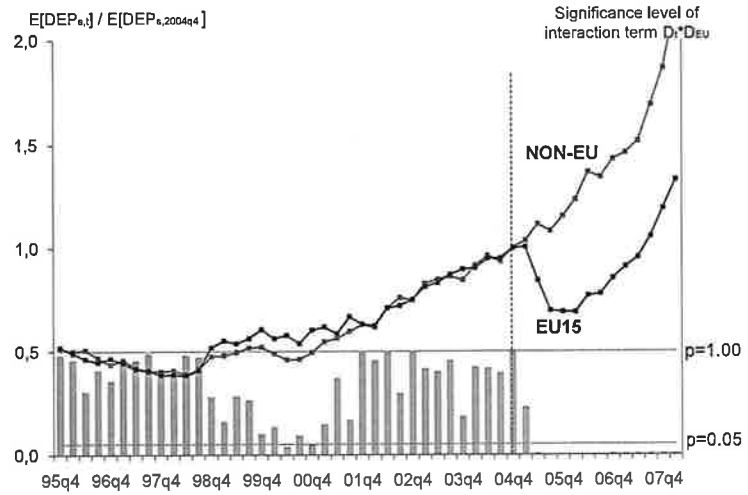
Note: Lines indicate trends in DEP_{st} as captured by coefficients on time dummies D_t and interaction terms D_t*D_{EU}, specifically $\exp(\gamma_t)$ for NON-EU and $\exp(\gamma_t+\lambda_t)$ for EU15 (left axis). Columns indicate statistical significance levels of interaction terms D_t*D_{EU} (right axis).

Figure 4: Swiss deposits, EU15 vs. OECD



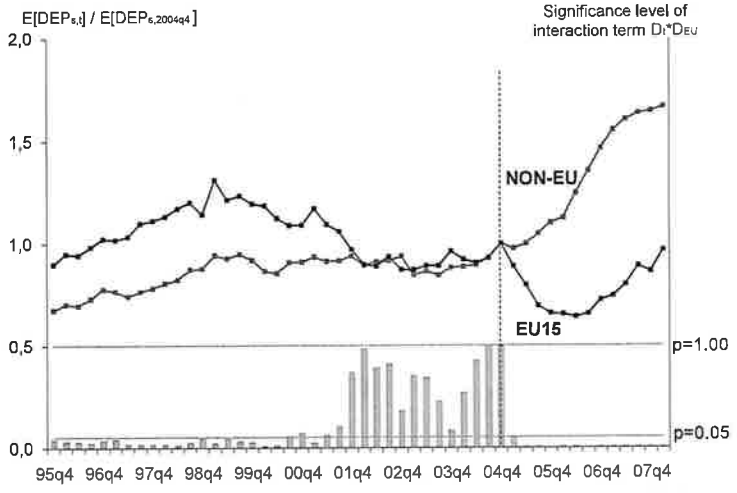
Note: Lines indicate trends in DEP_{st} as captured by coefficients on time dummies D_t and interaction terms D_t*D_{EU}, specifically $\exp(\gamma_t)$ for NON-EU and $\exp(\gamma_t+\lambda_t)$ for EU15 (left axis). Columns indicate statistical significance levels of interaction terms D_t*D_{EU} (right axis).

Figure 5a: EUR denominated Swiss deposits



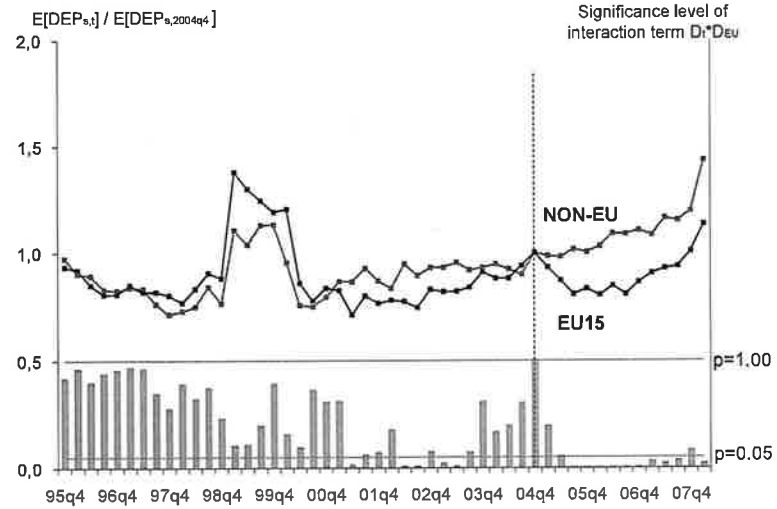
Note: Lines indicate trends in DEPst as captured by coefficients on time dummies Dt and interaction terms Dt*DEU, specifically exp(γ) for NON-EU and exp(γ+λ) for EU15 (left axis). Columns indicate statistical significance levels of interaction terms Dt*DEU (right axis).

Figure 5b: USD denominated Swiss deposits



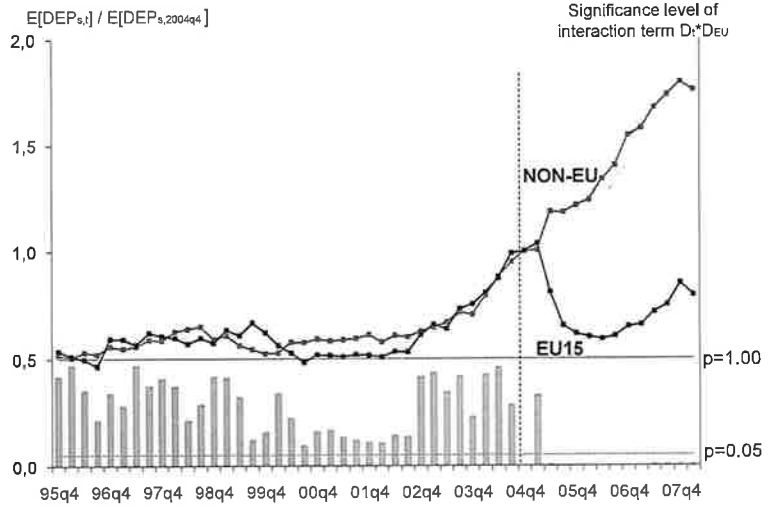
Note: Lines indicate trends in DEPst as captured by coefficients on time dummies Dt and interaction terms Dt*DEU, specifically exp(γ) for NON-EU and exp(γ+λ) for EU15 (left axis). Columns indicate statistical significance levels of interaction terms Dt*DEU (right axis).

Figure 5c: CHF denominated Swiss deposits



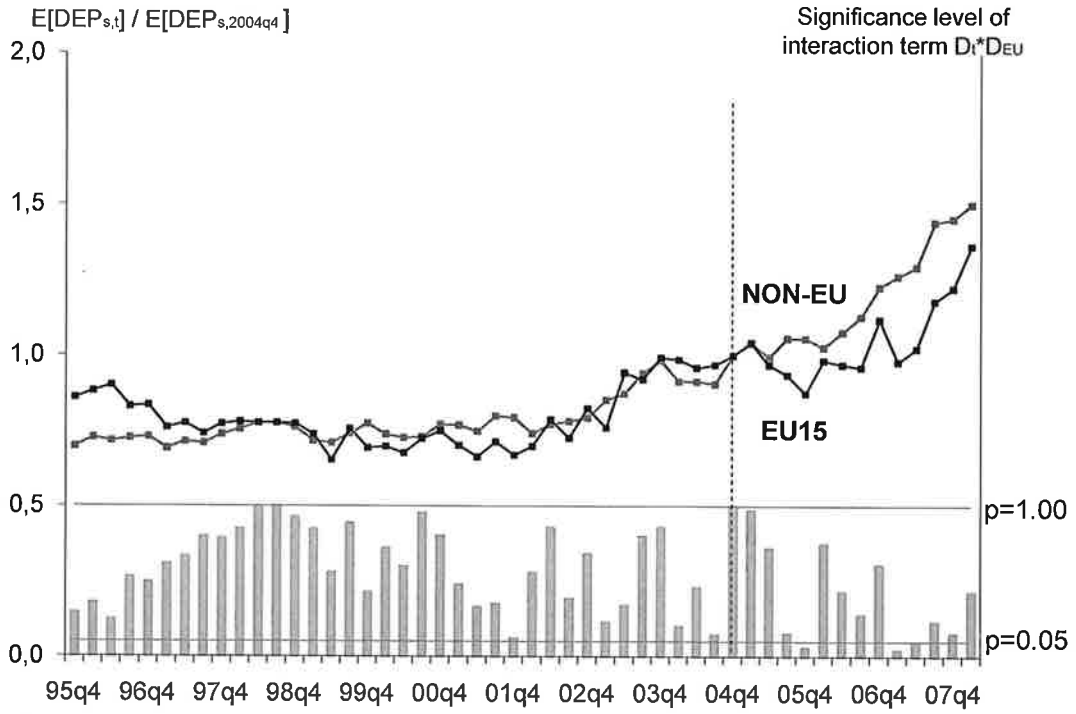
Note: Lines indicate trends in DEPst as captured by coefficients on time dummies Dt and interaction terms Dt*DEU, specifically exp(γ) for NON-EU and exp(γ+λ) for EU15 (left axis). Columns indicate statistical significance levels of interaction terms Dt*DEU (right axis).

Figure 5d: GBP denominated Swiss deposits



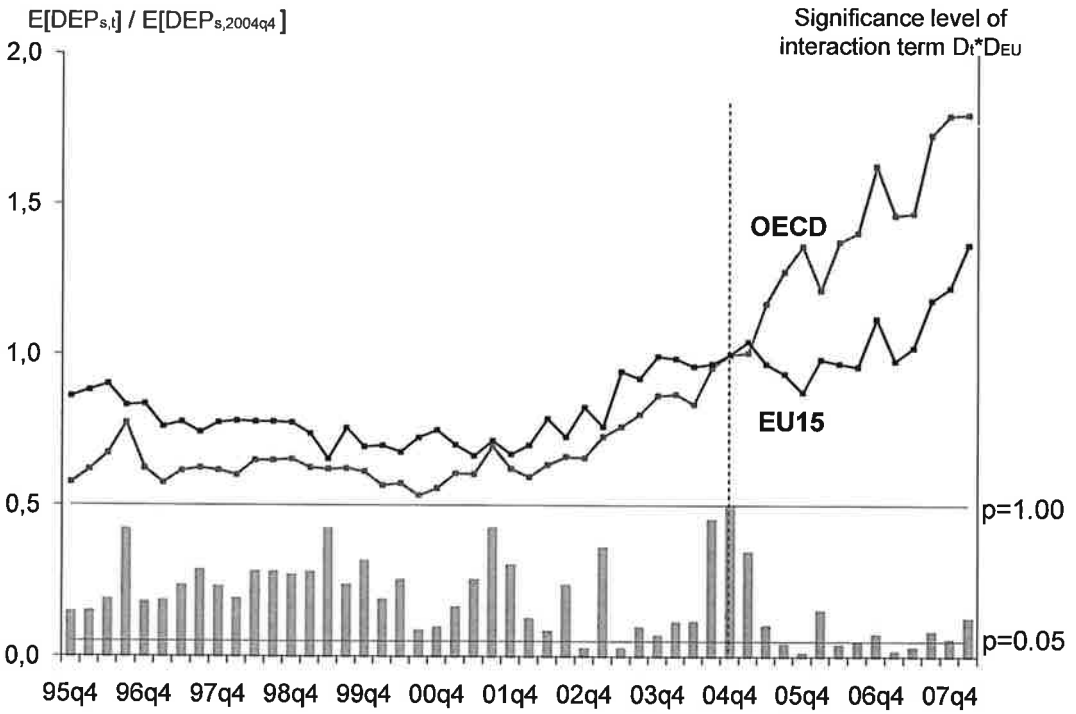
Note: Lines indicate trends in DEPst as captured by coefficients on time dummies Dt and interaction terms Dt*DEU, specifically exp(γ) for NON-EU and exp(γ+λ) for EU15 (left axis). Columns indicate statistical significance levels of interaction terms Dt*DEU (right axis).

Figure 6: Luxembourg deposits, EU15 vs. NON-EU



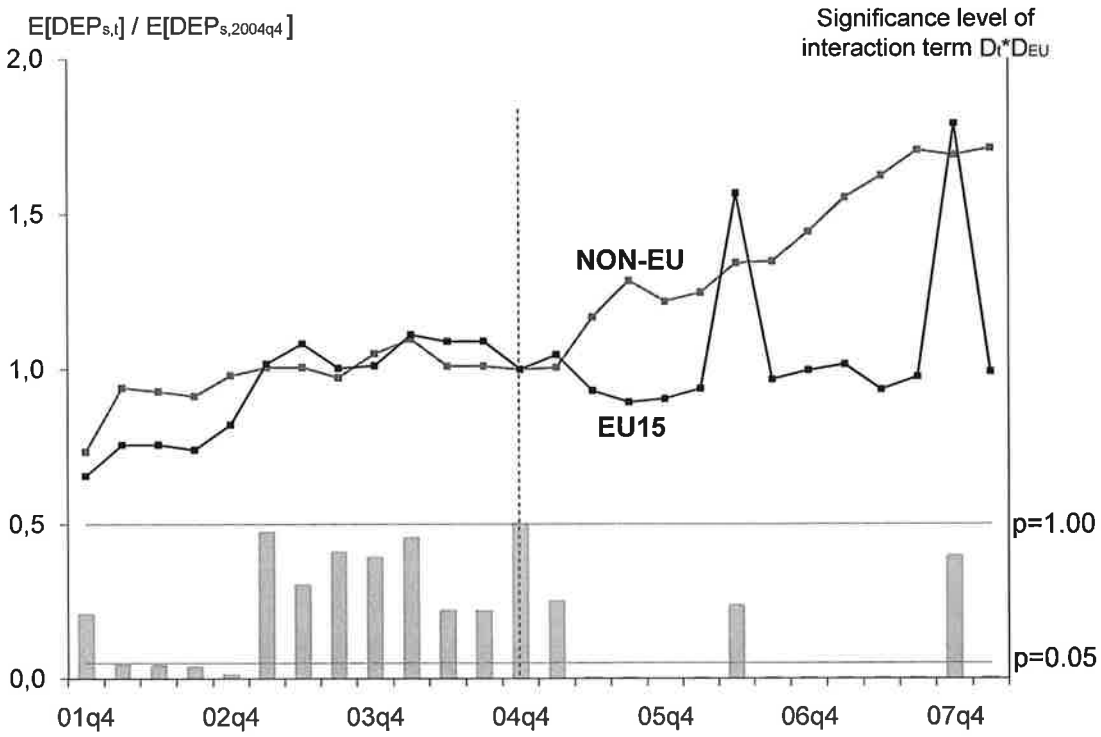
Note: Lines indicate trends in DEP_{st} as captured by coefficients on time dummies D_t and interaction terms D_t*D_{EU}, specifically $\exp(\gamma_t)$ for NON-EU and $\exp(\gamma_t+\lambda_t)$ for EU15 (left axis). Columns indicate statistical significance levels of interaction terms D_t*D_{EU} (right axis).

Figure 7: Luxembourg deposits, EU15 vs. OECD



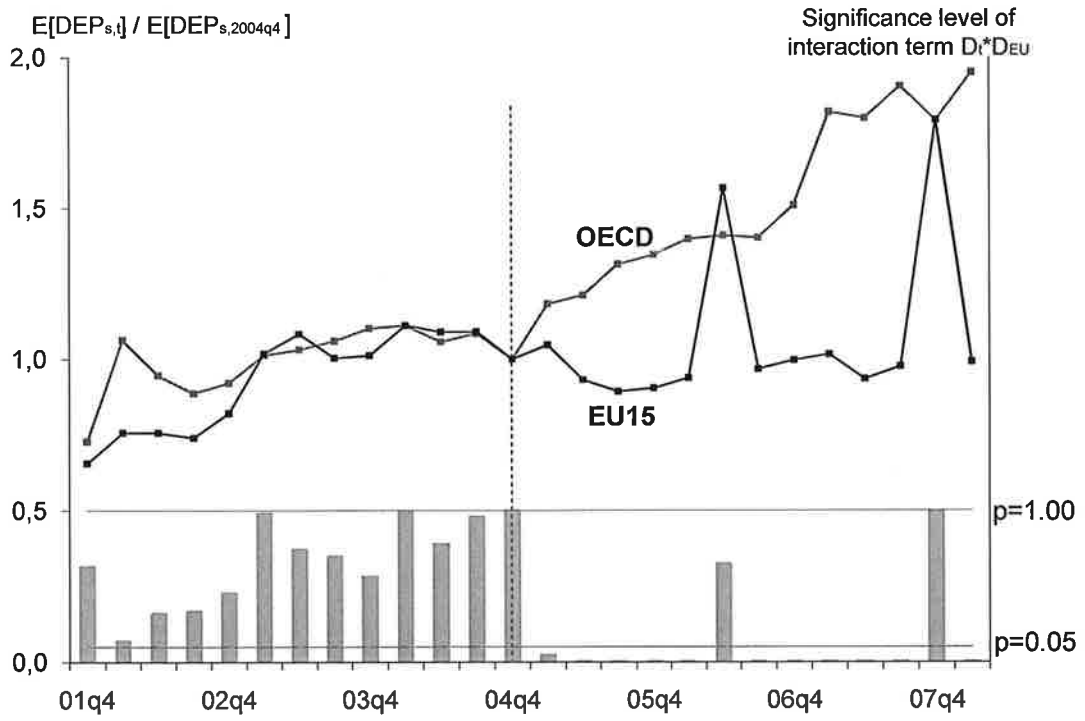
Note: Lines indicate trends in DEP_{st} as captured by coefficients on time dummies D_t and interaction terms D_t*D_{EU}, specifically $\exp(\gamma_t)$ for NON-EU and $\exp(\gamma_t+\lambda_t)$ for EU15 (left axis). Columns indicate statistical significance levels of interaction terms D_t*D_{EU} (right axis).

Figure 8: Jersey deposits, EU15 vs. NON-EU



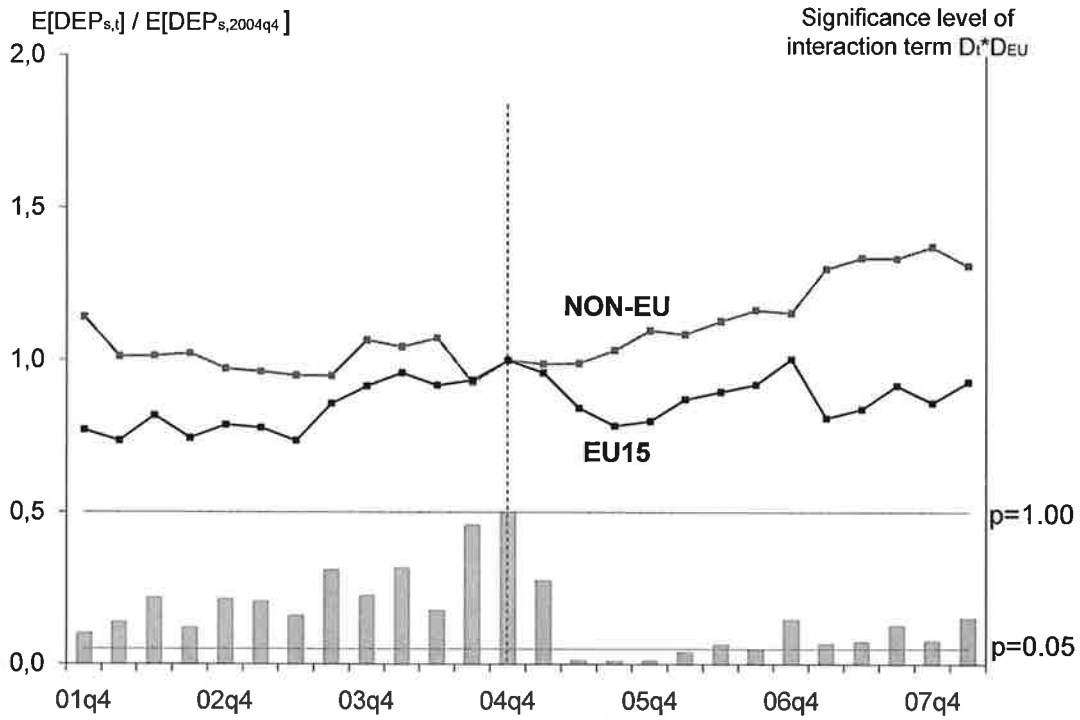
Note: Lines indicate trends in DEP_{st} as captured by coefficients on time dummies D_t and interaction terms D_t*D_{EU}, specifically $\exp(\gamma_t)$ for NON-EU and $\exp(\gamma_t+\lambda_t)$ for EU15 (left axis). Columns indicate statistical significance levels of interaction terms D_t*D_{EU} (right axis).

Figure 9: Jersey deposits, EU15 vs. OECD



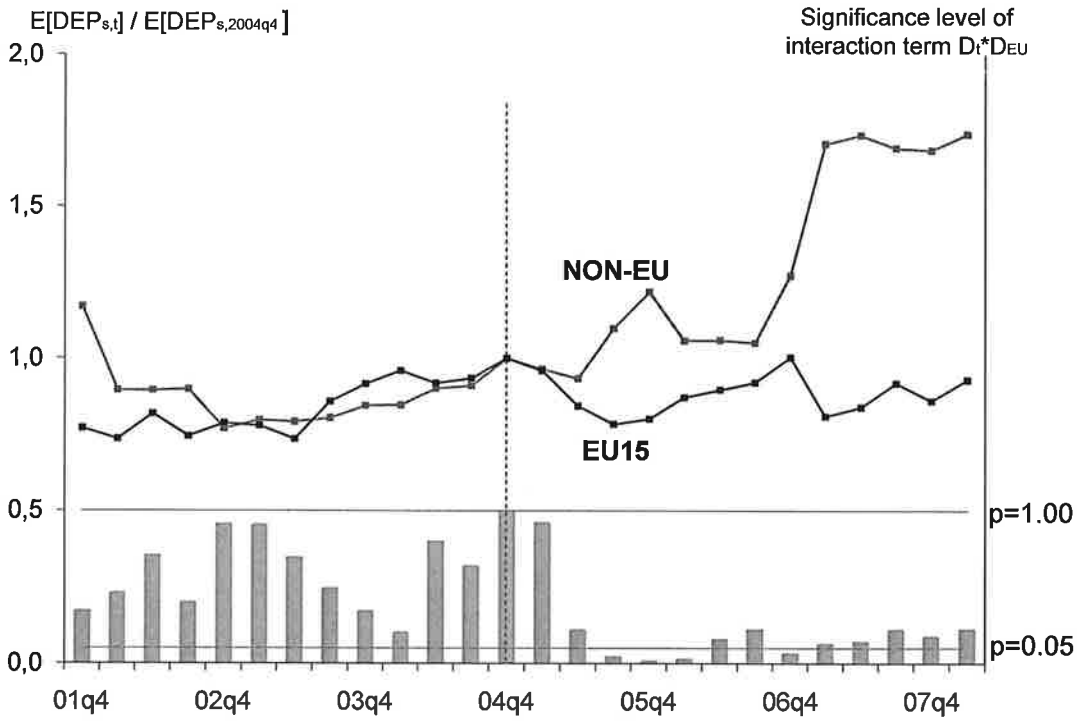
Note: Lines indicate trends in DEP_{st} as captured by coefficients on time dummies D_t and interaction terms D_t*D_{EU}, specifically $\exp(\gamma_t)$ for NON-EU and $\exp(\gamma_t+\lambda_t)$ for EU15 (left axis). Columns indicate statistical significance levels of interaction terms D_t*D_{EU} (right axis).

Figure 10: Guernsey deposits, EU15 vs. NON-EU



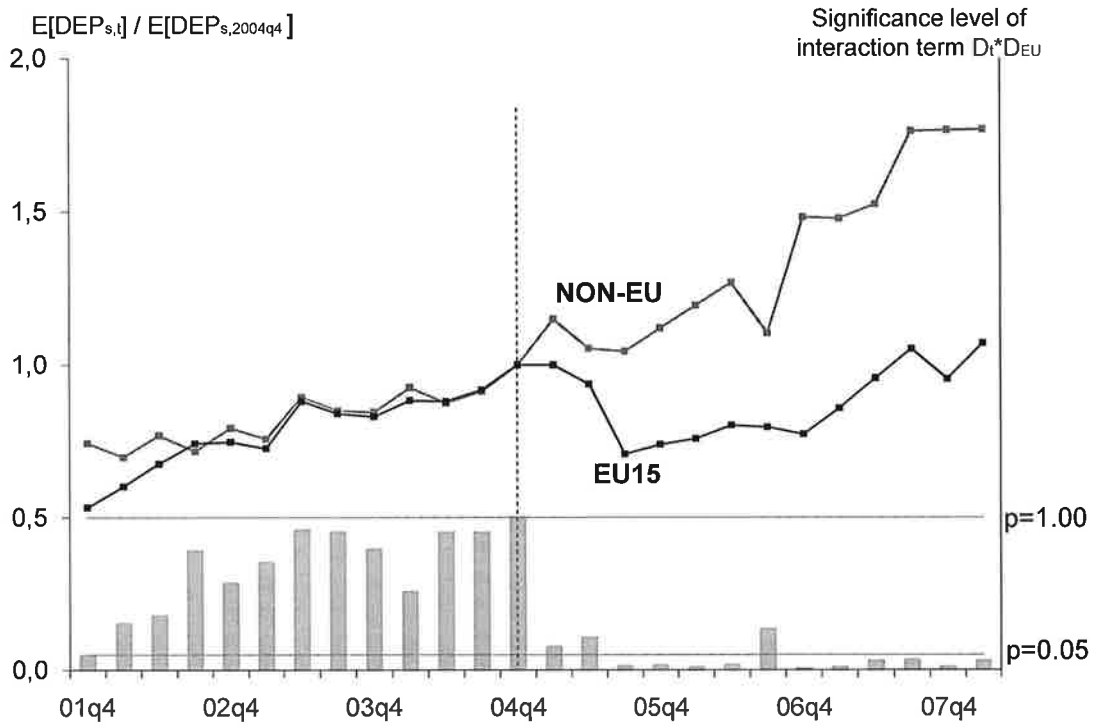
Note: Lines indicate trends in DEPst as captured by coefficients on time dummies Dt and interaction terms Dt*DEU, specifically exp(γt) for NON-EU and exp(γt+λt) for EU15 (left axis). Columns indicate statistical significance levels of interaction terms Dt*DEU (right axis).

Figure 11: Guernsey deposits, EU15 vs. OECD



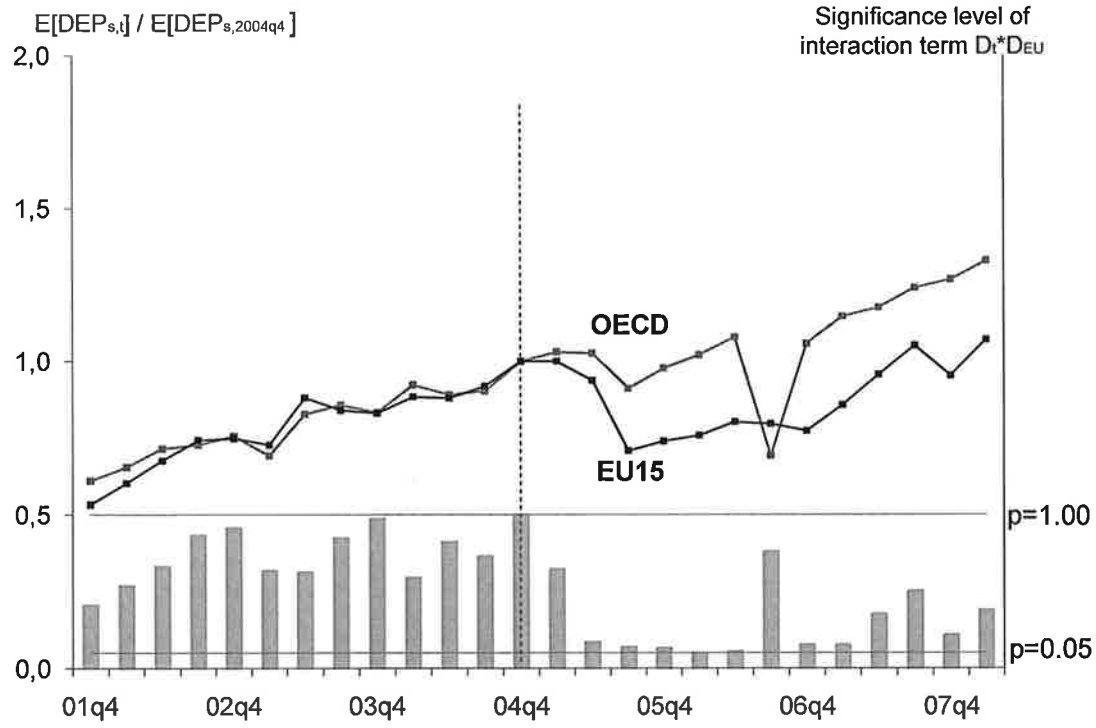
Note: Lines indicate trends in DEPst as captured by coefficients on time dummies Dt and interaction terms Dt*DEU, specifically exp(γt) for NON-EU and exp(γt+λt) for EU15 (left axis). Columns indicate statistical significance levels of interaction terms Dt*DEU (right axis).

Figure 12: Isle of Man deposits, EU15 vs. NON-EU



Note: Lines indicate trends in DEP_{st} as captured by coefficients on time dummies D_t and interaction terms D_t*D_{EU}, specifically $\exp(\gamma_t)$ for NON-EU and $\exp(\gamma_t+\lambda_t)$ for EU15 (left axis). Columns indicate statistical significance levels of interaction terms D_t*D_{EU} (right axis).

Figure 13: Isle of Man deposits, EU15 vs. OECD



Note: Lines indicate trends in DEP_{st} as captured by coefficients on time dummies D_t and interaction terms D_t*D_{EU}, specifically $\exp(\gamma_t)$ for NON-EU and $\exp(\gamma_t+\lambda_t)$ for EU15 (left axis). Columns indicate statistical significance levels of interaction terms D_t*D_{EU} (right axis).

Appendix B

NOT FOR PUBLICATION!!!

	Panel A				Panel B			
Banking Jur	Switzerland				Switzerland			
Treatment	EU15				NEW10			
Control	NON-EU				NON-EU			
Currency	ALL				ALL			
	Time dummies (D_t)		Interaction terms (D_t*EU)		Time dummies (D_t)		Interaction terms (D_t*EU)	
	coefficient	se	coefficient	se	coefficient	se	coefficient	se
1995q4	-0.440***	(0.0819)	0.0944	(0.136)	-0.440***	(0.0819)	-0.789***	(0.119)
1996q1	-0.420***	(0.0797)	0.0821	(0.137)	-0.420***	(0.0797)	-0.692***	(0.131)
1996q2	-0.445***	(0.0816)	0.0624	(0.139)	-0.445***	(0.0816)	-0.677***	(0.129)
1996q3	-0.446***	(0.0784)	0.0690	(0.135)	-0.446***	(0.0784)	-0.620***	(0.135)
1996q4	-0.389***	(0.0792)	0.0569	(0.136)	-0.389***	(0.0792)	-0.595***	(0.149)
1997q1	-0.380***	(0.0801)	0.0336	(0.137)	-0.380***	(0.0801)	-0.622***	(0.161)
1997q2	-0.408***	(0.0777)	0.0371	(0.135)	-0.408***	(0.0778)	-0.507***	(0.164)
1997q3	-0.408***	(0.0741)	0.0776	(0.139)	-0.408***	(0.0741)	-0.428**	(0.187)
1997q4	-0.401***	(0.0731)	0.0537	(0.134)	-0.401***	(0.0731)	-0.408**	(0.183)
1998q1	-0.359***	(0.0730)	0.0139	(0.128)	-0.359***	(0.0730)	-0.450**	(0.192)
1998q2	-0.388***	(0.0711)	0.0762	(0.132)	-0.388***	(0.0711)	-0.411**	(0.185)
1998q3	-0.315***	(0.0710)	0.0462	(0.132)	-0.315***	(0.0710)	-0.402**	(0.186)
1998q4	-0.310***	(0.0705)	0.0447	(0.118)	-0.310***	(0.0706)	-0.334**	(0.155)
1999q1	-0.203***	(0.0685)	0.113	(0.118)	-0.203***	(0.0685)	-0.256**	(0.129)
1999q2	-0.223***	(0.0677)	0.111	(0.118)	-0.223***	(0.0677)	-0.267**	(0.131)
1999q3	-0.158**	(0.0707)	0.0342	(0.106)	-0.158**	(0.0707)	-0.307**	(0.141)
1999q4	-0.201***	(0.0683)	0.0766	(0.0958)	-0.201***	(0.0683)	-0.235*	(0.137)
2000q1	-0.321***	(0.0725)	0.176	(0.115)	-0.321***	(0.0725)	-0.184	(0.138)
2000q2	-0.365***	(0.0663)	0.107	(0.0912)	-0.365***	(0.0663)	-0.148	(0.123)
2000q3	-0.341***	(0.0595)	0.0177	(0.0876)	-0.341***	(0.0595)	-0.0904	(0.126)
2000q4	-0.291***	(0.0577)	0.0210	(0.0947)	-0.291***	(0.0577)	-0.0820	(0.103)
2001q1	-0.242***	(0.0514)	0.000959	(0.0896)	-0.242***	(0.0514)	-0.00155	(0.109)
2001q2	-0.235***	(0.0502)	-0.0675	(0.0908)	-0.235***	(0.0502)	-0.00682	(0.108)
2001q3	-0.212***	(0.0488)	-0.0286	(0.0886)	-0.212***	(0.0488)	-0.0594	(0.0981)
2001q4	-0.222***	(0.0480)	-0.0725	(0.0786)	-0.222***	(0.0480)	-0.0648	(0.0896)
2002q1	-0.245***	(0.0478)	-0.0691	(0.0648)	-0.245***	(0.0478)	-0.0471	(0.0908)
2002q2	-0.195***	(0.0463)	-0.0795	(0.0687)	-0.195***	(0.0464)	-0.108	(0.0752)
2002q3	-0.196***	(0.0464)	-0.0537	(0.0734)	-0.196***	(0.0465)	-0.109	(0.0772)
2002q4	-0.143***	(0.0470)	-0.0824	(0.0678)	-0.143***	(0.0470)	-0.0940	(0.0734)
2003q1	-0.157***	(0.0434)	-0.0330	(0.0626)	-0.157***	(0.0434)	-0.0126	(0.0744)
2003q2	-0.150***	(0.0414)	-0.0264	(0.0621)	-0.150***	(0.0415)	-0.0406	(0.0582)
2003q3	-0.132***	(0.0364)	-0.00591	(0.0572)	-0.132***	(0.0364)	-0.0109	(0.0552)
2003q4	-0.110***	(0.0390)	0.0214	(0.0477)	-0.110***	(0.0390)	-0.0364	(0.0490)
2004q1	-0.115***	(0.0369)	0.0175	(0.0495)	-0.115***	(0.0369)	-0.0170	(0.0484)
2004q2	-0.0972***	(0.0333)	0.0207	(0.0438)	-0.0972***	(0.0333)	-0.0372	(0.0438)
2004q3	-0.0819**	(0.0354)	0.0276	(0.0482)	-0.0819**	(0.0354)	-0.0334	(0.0424)
2004q4	-	-	-	-	-	-	-	-
2005q1	-0.0124	(0.0261)	-0.0323	(0.0293)	-0.0124	(0.0261)	0.0626	(0.0414)
2005q2	0.0208	(0.0405)	-0.211***	(0.0503)	0.0208	(0.0405)	-0.0566	(0.0471)
2005q3	0.0663	(0.0412)	-0.405***	(0.0627)	0.0663	(0.0412)	-0.145**	(0.0579)
2005q4	0.0959**	(0.0381)	-0.439***	(0.0678)	0.0959**	(0.0381)	-0.212***	(0.0537)
2006q1	0.136***	(0.0396)	-0.481***	(0.0769)	0.136***	(0.0396)	-0.153**	(0.0733)
2006q2	0.239***	(0.0447)	-0.533***	(0.0896)	0.239***	(0.0447)	-0.102	(0.0893)
2006q3	0.299***	(0.0538)	-0.585***	(0.0983)	0.299***	(0.0538)	-0.0477	(0.109)
2006q4	0.375***	(0.0527)	-0.555***	(0.118)	0.375***	(0.0527)	-0.0790	(0.104)
2007q1	0.414***	(0.0568)	-0.559***	(0.121)	0.414***	(0.0568)	-0.130	(0.102)
2007q2	0.456***	(0.0580)	-0.539***	(0.115)	0.456***	(0.0580)	-0.0685	(0.112)
2007q3	0.498***	(0.0606)	-0.515***	(0.116)	0.498***	(0.0606)	-0.0159	(0.142)
2007q4	0.555***	(0.0618)	-0.502***	(0.122)	0.555***	(0.0618)	-0.125	(0.126)
2008q1	0.609***	(0.0624)	-0.455***	(0.123)	0.609***	(0.0624)	-0.0390	(0.127)
Observations	8858				8608			
R.-squared	0.963				0.956			

Note: Country dummies and constant term not reported. Standard errors are robust to heteroscedasticity and serial correlation

	Panel C				Panel D			
Banking Jur	Switzerland				Switzerland			
Treatment	EU15				EU15			
Control	OECD				NON-EU			
Currency	ALL				EURO			
	Time dummies (D_t)		Interaction terms (D_t*EU)		Time dummies (D_t)		Interaction terms (D_t*EU)	
	coefficient	se	coefficient	se	coefficient	se	coefficient	se
1995q4	-0.529***	(0.128)	0.184	(0.172)	-0.667***	(0.107)	0.00956	(0.172)
1996q1	-0.495***	(0.107)	0.157	(0.158)	-0.692***	(0.107)	-0.0196	(0.173)
1996q2	-0.411***	(0.140)	0.0281	(0.183)	-0.680***	(0.103)	-0.0919	(0.175)
1996q3	-0.461***	(0.149)	0.0847	(0.189)	-0.762***	(0.104)	-0.0440	(0.179)
1996q4	-0.435***	(0.0940)	0.102	(0.149)	-0.832***	(0.0988)	0.0647	(0.170)
1997q1	-0.461***	(0.0799)	0.115	(0.142)	-0.784***	(0.0996)	-0.0316	(0.176)
1997q2	-0.438***	(0.109)	0.0666	(0.159)	-0.863***	(0.0960)	-0.0224	(0.182)
1997q3	-0.409***	(0.121)	0.0789	(0.173)	-0.912***	(0.0926)	0.00652	(0.188)
1997q4	-0.385***	(0.114)	0.0376	(0.164)	-0.911***	(0.0935)	-0.0432	(0.183)
1998q1	-0.361***	(0.126)	0.0157	(0.168)	-0.899***	(0.0882)	-0.0523	(0.172)
1998q2	-0.317***	(0.0887)	0.00598	(0.147)	-0.951***	(0.0902)	-0.00904	(0.169)
1998q3	-0.277***	(0.0790)	0.00788	(0.142)	-0.888***	(0.0900)	-0.0134	(0.170)
1998q4	-0.271***	(0.0845)	0.00545	(0.131)	-0.742***	(0.0893)	0.0843	(0.141)
1999q1	-0.104	(0.0997)	0.0141	(0.143)	-0.734***	(0.0865)	0.141	(0.139)
1999q2	-0.169*	(0.0916)	0.0572	(0.137)	-0.702***	(0.0878)	0.0831	(0.143)
1999q3	-0.176***	(0.0619)	0.0525	(0.103)	-0.657***	(0.0859)	0.0822	(0.128)
1999q4	-0.171**	(0.0679)	0.0469	(0.0981)	-0.651***	(0.0846)	0.152	(0.116)
2000q1	-0.164**	(0.0670)	0.0192	(0.116)	-0.716***	(0.0890)	0.141	(0.125)
2000q2	-0.157**	(0.0593)	-0.101	(0.0887)	-0.779***	(0.0833)	0.232*	(0.125)
2000q3	-0.204***	(0.0605)	-0.119	(0.0908)	-0.775***	(0.0806)	0.156	(0.115)
2000q4	-0.163**	(0.0704)	-0.107	(0.106)	-0.704***	(0.0768)	0.199*	(0.115)
2001q1	-0.161**	(0.0632)	-0.0794	(0.0999)	-0.604***	(0.0773)	0.123	(0.115)
2001q2	-0.128*	(0.0706)	-0.175	(0.107)	-0.572***	(0.0708)	0.0375	(0.111)
2001q3	-0.135**	(0.0544)	-0.106	(0.0950)	-0.516***	(0.0783)	0.111	(0.112)
2001q4	-0.149**	(0.0671)	-0.146	(0.0938)	-0.461***	(0.0762)	0.00222	(0.108)
2002q1	-0.157**	(0.0619)	-0.157*	(0.0772)	-0.483***	(0.0725)	0.0125	(0.103)
2002q2	-0.113*	(0.0566)	-0.162**	(0.0779)	-0.347***	(0.0703)	0.00230	(0.0998)
2002q3	-0.136***	(0.0480)	-0.114	(0.0768)	-0.277***	(0.0667)	-0.0513	(0.0939)
2002q4	-0.0804	(0.0925)	-0.145	(0.106)	-0.291***	(0.0626)	0.00178	(0.0919)
2003q1	-0.0855	(0.0872)	-0.105	(0.0993)	-0.189***	(0.0563)	-0.0181	(0.0811)
2003q2	-0.0594	(0.0865)	-0.117	(0.0992)	-0.164***	(0.0541)	-0.0206	(0.0785)
2003q3	-0.113*	(0.0623)	-0.0253	(0.0778)	-0.146***	(0.0543)	0.00980	(0.0801)
2003q4	-0.0972*	(0.0560)	0.00872	(0.0630)	-0.166***	(0.0478)	0.0582	(0.0641)
2004q1	-0.0706	(0.0441)	-0.0264	(0.0562)	-0.0880*	(0.0496)	-0.0121	(0.0602)
2004q2	-0.0672*	(0.0337)	-0.00934	(0.0451)	-0.0389	(0.0483)	-0.0133	(0.0605)
2004q3	-0.0969*	(0.0501)	0.0426	(0.0607)	-0.0667*	(0.0401)	0.0150	(0.0539)
2004q4	-	-	-	-	-	-	-	-
2005q1	0.00688	(0.0263)	-0.0516*	(0.0298)	0.0344	(0.0343)	-0.0293	(0.0387)
2005q2	0.0301	(0.0185)	-0.220***	(0.0365)	0.109**	(0.0509)	-0.278***	(0.0590)
2005q3	0.112	(0.0697)	-0.451***	(0.0857)	0.0792	(0.0543)	-0.440***	(0.0729)
2005q4	0.120***	(0.0366)	-0.463***	(0.0695)	0.144***	(0.0503)	-0.515***	(0.0774)
2006q1	0.118***	(0.0232)	-0.464***	(0.0732)	0.210***	(0.0505)	-0.583***	(0.0829)
2006q2	0.272***	(0.0575)	-0.566***	(0.1000)	0.311***	(0.0527)	-0.574***	(0.0885)
2006q3	0.309***	(0.0620)	-0.595***	(0.107)	0.294***	(0.0606)	-0.544***	(0.102)
2006q4	0.320***	(0.0641)	-0.501***	(0.128)	0.357***	(0.0573)	-0.513***	(0.119)
2007q1	0.392***	(0.0651)	-0.537***	(0.130)	0.379***	(0.0660)	-0.472***	(0.131)
2007q2	0.373***	(0.0582)	-0.456***	(0.120)	0.416***	(0.0670)	-0.462***	(0.120)
2007q3	0.426***	(0.0588)	-0.442***	(0.120)	0.525***	(0.0649)	-0.470***	(0.111)
2007q4	0.499***	(0.0789)	-0.446***	(0.136)	0.624***	(0.0693)	-0.447***	(0.129)
2008q1	0.510***	(0.0710)	-0.356**	(0.132)	0.770***	(0.0656)	-0.486***	(0.123)
Observations	1250				7674			
R.-squared	0.983				0.938			

Note: Country dummies and constant term not reported. Standard errors are robust to heteroscedasticity and serial correlation

	Panel E				Panel F			
Banking Jur	Switzerland				Switzerland			
Treatment	EU15				EU15			
Control	NON-EU				NON-EU			
Currency	USD				CHF			
	Time dummies (D_t)		Interaction terms (D_t*EU)		Time dummies (D_t)		Interaction terms (D_t*EU)	
	coefficient	se	coefficient	se	coefficient	se	coefficient	se
1995q4	-0.396***	(0.0784)	0.289*	(0.162)	-0.0263	(0.0959)	-0.0415	(0.198)
1996q1	-0.354***	(0.0778)	0.302*	(0.158)	-0.102	(0.0943)	0.0190	(0.191)
1996q2	-0.363***	(0.0769)	0.304*	(0.156)	-0.114	(0.0926)	-0.0487	(0.187)
1996q3	-0.316***	(0.0729)	0.299**	(0.146)	-0.186**	(0.0876)	-0.0288	(0.184)
1996q4	-0.252***	(0.0737)	0.275*	(0.150)	-0.192**	(0.0825)	-0.0203	(0.178)
1997q1	-0.267***	(0.0756)	0.285*	(0.160)	-0.177**	(0.0858)	0.0142	(0.183)
1997q2	-0.300***	(0.0749)	0.333**	(0.150)	-0.182**	(0.0807)	-0.0180	(0.187)
1997q3	-0.268***	(0.0743)	0.362**	(0.161)	-0.273***	(0.0864)	0.0724	(0.184)
1997q4	-0.246***	(0.0760)	0.352**	(0.156)	-0.336***	(0.0812)	0.116	(0.195)
1998q1	-0.215***	(0.0757)	0.340**	(0.153)	-0.316***	(0.0825)	0.0518	(0.185)
1998q2	-0.194***	(0.0715)	0.353**	(0.149)	-0.289***	(0.0803)	0.106	(0.231)
1998q3	-0.135*	(0.0748)	0.319**	(0.157)	-0.171**	(0.0844)	0.0724	(0.224)
1998q4	-0.130*	(0.0757)	0.264*	(0.155)	-0.268***	(0.0772)	0.142	(0.194)
1999q1	-0.0596	(0.0795)	0.330**	(0.158)	0.0997	(0.0661)	0.221	(0.175)
1999q2	-0.0752	(0.0767)	0.270*	(0.159)	0.0365	(0.0637)	0.225	(0.182)
1999q3	-0.0531	(0.0775)	0.264*	(0.138)	0.121*	(0.0618)	0.0978	(0.115)
1999q4	-0.0841	(0.0804)	0.263**	(0.132)	0.123*	(0.0688)	0.0518	(0.190)
2000q1	-0.143*	(0.0812)	0.314***	(0.121)	-0.0468	(0.0731)	0.233	(0.232)
2000q2	-0.156**	(0.0726)	0.273**	(0.113)	-0.279***	(0.0650)	0.127	(0.0968)
2000q3	-0.0963	(0.0697)	0.182	(0.112)	-0.288***	(0.0675)	0.0348	(0.0993)
2000q4	-0.0942	(0.0644)	0.181	(0.122)	-0.230***	(0.0681)	0.0515	(0.103)
2001q1	-0.0679	(0.0646)	0.227**	(0.112)	-0.143**	(0.0565)	-0.0489	(0.100)
2001q2	-0.0899	(0.0580)	0.180	(0.116)	-0.144**	(0.0643)	-0.196**	(0.0884)
2001q3	-0.0878	(0.0595)	0.146	(0.115)	-0.0756	(0.0587)	-0.148	(0.0951)
2001q4	-0.0622	(0.0545)	0.0324	(0.0947)	-0.140***	(0.0528)	-0.128	(0.0870)
2002q1	-0.111**	(0.0553)	0.00387	(0.0897)	-0.181***	(0.0572)	-0.0684	(0.0741)
2002q2	-0.0935	(0.0568)	-0.0228	(0.0806)	-0.0552	(0.0502)	-0.201***	(0.0764)
2002q3	-0.0874	(0.0538)	0.0209	(0.0871)	-0.113**	(0.0436)	-0.181**	(0.0730)
2002q4	-0.0640	(0.0550)	-0.0714	(0.0770)	-0.0719*	(0.0414)	-0.115	(0.0793)
2003q1	-0.166***	(0.0525)	0.0287	(0.0746)	-0.0704*	(0.0379)	-0.129**	(0.0631)
2003q2	-0.144***	(0.0496)	0.0294	(0.0713)	-0.0471	(0.0377)	-0.151**	(0.0615)
2003q3	-0.167***	(0.0483)	0.0520	(0.0685)	-0.0840**	(0.0371)	-0.0905	(0.0619)
2003q4	-0.125**	(0.0511)	0.0861	(0.0617)	-0.0715**	(0.0343)	-0.0231	(0.0460)
2004q1	-0.120**	(0.0461)	0.0395	(0.0633)	-0.0553*	(0.0296)	-0.0720	(0.0749)
2004q2	-0.110***	(0.0411)	0.0101	(0.0540)	-0.0795***	(0.0270)	-0.0479	(0.0564)
2004q3	-0.0740*	(0.0387)	0.000610	(0.0525)	-0.108***	(0.0319)	0.0449	(0.0870)
2004q4	-	-	-	-	-	-	-	-
2005q1	-0.0247	(0.0339)	-0.0924	(0.0562)	-0.0150	(0.0263)	-0.0557	(0.0647)
2005q2	-0.00274	(0.0479)	-0.223***	(0.0700)	-0.0195	(0.0288)	-0.119	(0.0738)
2005q3	0.0466	(0.0486)	-0.412***	(0.0830)	0.0155	(0.0331)	-0.230***	(0.0623)
2005q4	0.0968**	(0.0464)	-0.517***	(0.0916)	0.00366	(0.0313)	-0.187***	(0.0610)
2006q1	0.118**	(0.0483)	-0.545***	(0.110)	0.0288	(0.0359)	-0.248***	(0.0722)
2006q2	0.220***	(0.0498)	-0.665***	(0.129)	0.0846**	(0.0410)	-0.251***	(0.0798)
2006q3	0.303***	(0.0575)	-0.726***	(0.127)	0.0833*	(0.0462)	-0.298***	(0.0724)
2006q4	0.382***	(0.0599)	-0.706***	(0.155)	0.0992**	(0.0454)	-0.246***	(0.0868)
2007q1	0.440***	(0.0592)	-0.736***	(0.148)	0.0790	(0.0507)	-0.179*	(0.0957)
2007q2	0.473***	(0.0609)	-0.695***	(0.141)	0.150***	(0.0533)	-0.226**	(0.109)
2007q3	0.492***	(0.0650)	-0.607***	(0.145)	0.140***	(0.0508)	-0.205*	(0.112)
2007q4	0.498***	(0.0673)	-0.644***	(0.140)	0.179***	(0.0505)	-0.172	(0.125)
2008q1	0.511***	(0.0680)	-0.544***	(0.154)	0.360***	(0.0573)	-0.236**	(0.114)
Observations	8621				7143			
R.-squared	0.957				0.952			

Note: Country dummies and constant term not reported. Standard errors are robust to heteroscedasticity and serial correlation

	Panel G				Panel H			
Banking Jur	Switzerland				Switzerland			
Treatment	EU15				EU15			
Control	NON-EU				NON-OFC			
Currency	GBP				ALL			
	Time dummies (D_t)		Interaction terms (D_t*EU)		Time dummies (D_t)		Interaction terms (D_t*EU)	
	coefficient	se	coefficient	se	coefficient	se	coefficient	se
1995q4	-0.658***	(0.107)	0.0332	(0.158)	-0.334***	(0.0849)	-0.0112	(0.138)
1996q1	-0.684***	(0.110)	0.0129	(0.167)	-0.319***	(0.0797)	-0.0190	(0.137)
1996q2	-0.635***	(0.108)	-0.0646	(0.169)	-0.350***	(0.0836)	-0.0328	(0.140)
1996q3	-0.654***	(0.103)	-0.110	(0.138)	-0.366***	(0.0810)	-0.0111	(0.137)
1996q4	-0.585***	(0.116)	0.0605	(0.145)	-0.314***	(0.0832)	-0.0181	(0.138)
1997q1	-0.602***	(0.110)	0.0763	(0.132)	-0.277***	(0.0815)	-0.0691	(0.138)
1997q2	-0.584***	(0.105)	0.0125	(0.149)	-0.312***	(0.0785)	-0.0592	(0.136)
1997q3	-0.530***	(0.0982)	0.0516	(0.157)	-0.291***	(0.0740)	-0.0393	(0.139)
1997q4	-0.536***	(0.106)	0.0352	(0.146)	-0.288***	(0.0734)	-0.0590	(0.134)
1998q1	-0.469***	(0.104)	-0.0464	(0.140)	-0.265***	(0.0761)	-0.0799	(0.130)
1998q2	-0.448***	(0.0962)	-0.114	(0.142)	-0.299***	(0.0735)	-0.0125	(0.133)
1998q3	-0.431***	(0.0976)	-0.0848	(0.149)	-0.237***	(0.0735)	-0.0324	(0.134)
1998q4	-0.525***	(0.100)	-0.0322	(0.153)	-0.219***	(0.0716)	-0.0467	(0.119)
1999q1	-0.497***	(0.0977)	0.0403	(0.178)	-0.123*	(0.0681)	0.0330	(0.118)
1999q2	-0.576***	(0.0959)	0.0788	(0.170)	-0.156**	(0.0661)	0.0439	(0.117)
1999q3	-0.609***	(0.0947)	0.203	(0.173)	-0.0697	(0.0695)	-0.0539	(0.105)
1999q4	-0.645***	(0.101)	0.170	(0.168)	-0.109*	(0.0625)	-0.0148	(0.0919)
2000q1	-0.639***	(0.109)	0.0616	(0.146)	-0.244***	(0.0697)	0.0991	(0.114)
2000q2	-0.548***	(0.0893)	-0.0912	(0.120)	-0.306***	(0.0643)	0.0481	(0.0898)
2000q3	-0.552***	(0.0937)	-0.175	(0.132)	-0.295***	(0.0591)	-0.0283	(0.0874)
2000q4	-0.524***	(0.0872)	-0.133	(0.134)	-0.246***	(0.0609)	-0.0238	(0.0968)
2001q1	-0.541***	(0.0816)	-0.121	(0.126)	-0.185***	(0.0531)	-0.0556	(0.0906)
2001q2	-0.532***	(0.0836)	-0.142	(0.127)	-0.179***	(0.0515)	-0.124	(0.0916)
2001q3	-0.521***	(0.0791)	-0.134	(0.113)	-0.173***	(0.0511)	-0.0677	(0.0900)
2001q4	-0.492***	(0.0805)	-0.168	(0.136)	-0.202***	(0.0520)	-0.0920	(0.0812)
2002q1	-0.548***	(0.0769)	-0.130	(0.104)	-0.226***	(0.0516)	-0.0880	(0.0677)
2002q2	-0.498***	(0.0762)	-0.129	(0.120)	-0.189***	(0.0492)	-0.0858	(0.0707)
2002q3	-0.508***	(0.0767)	-0.124	(0.113)	-0.173***	(0.0499)	-0.0771	(0.0757)
2002q4	-0.468***	(0.0735)	-0.0246	(0.114)	-0.118**	(0.0523)	-0.108	(0.0716)
2003q1	-0.437***	(0.0736)	0.0184	(0.113)	-0.130***	(0.0477)	-0.0599	(0.0657)
2003q2	-0.406***	(0.0730)	-0.0419	(0.104)	-0.134***	(0.0459)	-0.0427	(0.0652)
2003q3	-0.336***	(0.0728)	0.0229	(0.110)	-0.117***	(0.0398)	-0.0213	(0.0594)
2003q4	-0.350***	(0.0683)	0.0656	(0.0883)	-0.0975**	(0.0417)	0.00907	(0.0499)
2004q1	-0.230***	(0.0638)	0.0149	(0.0781)	-0.111***	(0.0405)	0.0143	(0.0523)
2004q2	-0.127**	(0.0513)	-0.00845	(0.0814)	-0.0941**	(0.0375)	0.0176	(0.0471)
2004q3	-0.0521	(0.0383)	0.0423	(0.0741)	-0.0798*	(0.0418)	0.0255	(0.0531)
2004q4	-	-	-	-	-	-	-	-
2005q1	0.00543	(0.0534)	0.0290	(0.0648)	-0.0141	(0.0316)	-0.0307	(0.0342)
2005q2	0.170***	(0.0567)	-0.382***	(0.0882)	0.00819	(0.0486)	-0.198***	(0.0570)
2005q3	0.167**	(0.0680)	-0.593***	(0.108)	0.0502	(0.0490)	-0.389***	(0.0681)
2005q4	0.195***	(0.0722)	-0.680***	(0.104)	0.0786*	(0.0448)	-0.421***	(0.0719)
2006q1	0.215***	(0.0686)	-0.724***	(0.102)	0.107**	(0.0457)	-0.452***	(0.0803)
2006q2	0.291***	(0.0777)	-0.817***	(0.112)	0.211***	(0.0521)	-0.505***	(0.0936)
2006q3	0.339***	(0.0800)	-0.842***	(0.122)	0.261***	(0.0625)	-0.547***	(0.103)
2006q4	0.436***	(0.0831)	-0.869***	(0.139)	0.346***	(0.0602)	-0.526***	(0.121)
2007q1	0.457***	(0.0866)	-0.877***	(0.140)	0.388***	(0.0660)	-0.532***	(0.126)
2007q2	0.517***	(0.0883)	-0.851***	(0.168)	0.429***	(0.0674)	-0.512***	(0.121)
2007q3	0.552***	(0.0880)	-0.840***	(0.160)	0.469***	(0.0705)	-0.485***	(0.122)
2007q4	0.586***	(0.0898)	-0.748***	(0.158)	0.527***	(0.0720)	-0.475***	(0.127)
2008q1	0.565***	(0.0888)	-0.795***	(0.154)	0.573***	(0.0723)	-0.419***	(0.128)
Observations	5821				7411			
R.-squared	0.931				0.967			

Note: Country dummies and constant term not reported. Standard errors are robust to heteroscedasticity and serial correlation

	Panel I				Panel J			
Banking Jur	Luxembourg				Luxembourg			
Treatment	EU15				EU15			
Control	NON-EU				OECD			
Currency	ALL				ALL			
	Time dummies (D_t)		Interaction terms (D_t*EU)		Time dummies (D_t)		Interaction terms (D_t*EU)	
	coefficient	se	coefficient	se	coefficient	se	coefficient	se
1995q4	-0.360***	(0.0978)	0.209	(0.198)	-0.552	(0.324)	0.402	(0.371)
1996q1	-0.318***	(0.0985)	0.192	(0.207)	-0.481*	(0.272)	0.355	(0.332)
1996q2	-0.334***	(0.0905)	0.230	(0.197)	-0.398	(0.267)	0.294	(0.325)
1996q3	-0.320***	(0.0923)	0.135	(0.214)	-0.258	(0.289)	0.0733	(0.354)
1996q4	-0.314***	(0.0867)	0.134	(0.196)	-0.475*	(0.254)	0.295	(0.314)
1997q1	-0.368***	(0.0835)	0.0946	(0.187)	-0.554**	(0.252)	0.281	(0.307)
1997q2	-0.336***	(0.0779)	0.0822	(0.191)	-0.488*	(0.257)	0.234	(0.316)
1997q3	-0.344***	(0.0778)	0.0452	(0.175)	-0.472*	(0.253)	0.174	(0.303)
1997q4	-0.303***	(0.0796)	0.0454	(0.169)	-0.484*	(0.256)	0.227	(0.300)
1998q1	-0.281***	(0.0818)	0.0321	(0.167)	-0.511*	(0.248)	0.262	(0.291)
1998q2	-0.253***	(0.0797)	9.67e-05	(0.154)	-0.432	(0.267)	0.179	(0.301)
1998q3	-0.253***	(0.0797)	9.67e-05	(0.154)	-0.432	(0.267)	0.179	(0.301)
1998q4	-0.271***	(0.0738)	0.0137	(0.151)	-0.426*	(0.231)	0.169	(0.269)
1999q1	-0.334***	(0.0770)	0.0302	(0.156)	-0.470*	(0.238)	0.166	(0.278)
1999q2	-0.343***	(0.0788)	-0.0822	(0.140)	-0.478**	(0.231)	0.0530	(0.262)
1999q3	-0.300***	(0.0769)	0.0206	(0.145)	-0.475*	(0.233)	0.195	(0.266)
1999q4	-0.256***	(0.0761)	-0.110	(0.139)	-0.492**	(0.227)	0.126	(0.258)
2000q1	-0.304***	(0.0828)	-0.0550	(0.155)	-0.569***	(0.185)	0.209	(0.231)
2000q2	-0.318***	(0.0798)	-0.0732	(0.139)	-0.558**	(0.216)	0.167	(0.247)
2000q3	-0.316***	(0.0789)	-0.00716	(0.123)	-0.630***	(0.193)	0.307	(0.217)
2000q4	-0.259***	(0.0801)	-0.0296	(0.118)	-0.586***	(0.200)	0.297	(0.220)
2001q1	-0.263***	(0.0724)	-0.0922	(0.129)	-0.502***	(0.0909)	0.146	(0.145)
2001q2	-0.290***	(0.0738)	-0.120	(0.123)	-0.505***	(0.0964)	0.0956	(0.141)
2001q3	-0.224***	(0.0713)	-0.113	(0.120)	-0.362***	(0.0812)	0.0253	(0.131)
2001q4	-0.230***	(0.0716)	-0.171	(0.110)	-0.476***	(0.113)	0.0746	(0.143)
2002q1	-0.300***	(0.0678)	-0.0583	(0.0995)	-0.521***	(0.114)	0.163	(0.137)
2002q2	-0.258***	(0.0625)	0.0186	(0.103)	-0.455***	(0.123)	0.215	(0.150)
2002q3	-0.246***	(0.0630)	-0.0738	(0.0845)	-0.415***	(0.116)	0.0959	(0.131)
2002q4	-0.232***	(0.0618)	0.0387	(0.0945)	-0.419***	(0.0784)	0.226**	(0.109)
2003q1	-0.160***	(0.0544)	-0.113	(0.0936)	-0.318***	(0.0934)	0.0449	(0.123)
2003q2	-0.135***	(0.0509)	0.0773	(0.0814)	-0.273***	(0.0821)	0.215*	(0.106)
2003q3	-0.0601	(0.0459)	-0.0227	(0.0889)	-0.221***	(0.0639)	0.138	(0.103)
2003q4	-0.0169	(0.0419)	0.0108	(0.0614)	-0.147*	(0.0787)	0.141	(0.0918)
2004q1	-0.0894**	(0.0361)	0.0760	(0.0592)	-0.141	(0.0888)	0.127	(0.102)
2004q2	-0.0894***	(0.0341)	0.0487	(0.0657)	-0.180*	(0.0962)	0.140	(0.113)
2004q3	-0.0987***	(0.0292)	0.0674	(0.0461)	-0.0436	(0.0897)	0.0122	(0.0973)
2004q4	-	-	-	-	-	-	-	-
2005q1	0.0404	(0.0311)	0.00171	(0.0470)	0.00509	(0.0833)	0.0371	(0.0912)
2005q2	-0.00566	(0.0350)	-0.0259	(0.0721)	0.157	(0.127)	-0.188	(0.143)
2005q3	0.0557	(0.0470)	-0.122	(0.0842)	0.244	(0.152)	-0.310*	(0.169)
2005q4	0.0558	(0.0517)	-0.189*	(0.1000)	0.308*	(0.152)	-0.441**	(0.177)
2006q1	0.0271	(0.0399)	-0.0434	(0.136)	0.194	(0.144)	-0.210	(0.198)
2006q2	0.0747*	(0.0421)	-0.105	(0.133)	0.318**	(0.135)	-0.348*	(0.189)
2006q3	0.121***	(0.0430)	-0.161	(0.147)	0.340**	(0.159)	-0.381*	(0.217)
2006q4	0.205***	(0.0447)	-0.0923	(0.180)	0.487***	(0.166)	-0.374	(0.248)
2007q1	0.234***	(0.0474)	-0.255**	(0.125)	0.381***	(0.126)	-0.402**	(0.175)
2007q2	0.258***	(0.0527)	-0.235*	(0.140)	0.385***	(0.116)	-0.362*	(0.179)
2007q3	0.366***	(0.0559)	-0.200	(0.166)	0.549**	(0.207)	-0.383	(0.265)
2007q4	0.374***	(0.0591)	-0.173	(0.121)	0.585***	(0.204)	-0.385	(0.232)
2008q1	0.406***	(0.0613)	-0.0957	(0.121)	0.587***	(0.206)	-0.276	(0.233)
Observations	7735				1236			
R.-squared	0.953				0.955			

Note: Country dummies and constant term not reported. Standard errors are robust to heteroscedasticity and serial correlation

	Panel K				Panel L			
Banking Jur	Jersey				Jersey			
Treatment	EU15				EU15			
Control	NON-EU				OECD			
Currency	ALL				ALL			
	Time dummies (D_t)		Interaction terms (D_t*EU)		Time dummies (D_t)		Interaction terms (D_t*EU)	
	coefficient	se	coefficient	se	coefficient	se	coefficient	se
1995q4								
1996q1								
1996q2								
1996q3								
1996q4								
1997q1								
1997q2								
1997q3								
1997q4								
1998q1								
1998q2								
1998q3								
1998q4								
1999q1								
1999q2								
1999q3								
1999q4								
2000q1								
2000q2								
2000q3								
2000q4								
2001q1								
2001q2								
2001q3								
2001q4	-0.308***	(0.0679)	-0.113	(0.139)	-0.317*	(0.174)	-0.104	(0.215)
2002q1	-0.0609	(0.0639)	-0.218*	(0.126)	0.0622	(0.192)	-0.341	(0.223)
2002q2	-0.0734	(0.0614)	-0.205*	(0.117)	-0.0550	(0.195)	-0.224	(0.221)
2002q3	-0.0906	(0.0644)	-0.210*	(0.117)	-0.119	(0.155)	-0.182	(0.185)
2002q4	-0.0198	(0.0623)	-0.176**	(0.0770)	-0.0817	(0.144)	-0.115	(0.151)
2003q1	0.00636	(0.0702)	0.0117	(0.167)	0.0132	(0.121)	0.00488	(0.199)
2003q2	0.00715	(0.0690)	0.0728	(0.140)	0.0314	(0.0728)	0.0486	(0.147)
2003q3	-0.0266	(0.0517)	0.0307	(0.133)	0.0585	(0.0518)	-0.0545	(0.139)
2003q4	0.0498	(0.0500)	-0.0374	(0.137)	0.0975*	(0.0538)	-0.0850	(0.145)
2004q1	0.0935*	(0.0494)	0.0125	(0.110)	0.106*	(0.0537)	-0.000354	(0.116)
2004q2	0.0106	(0.0359)	0.0758	(0.0977)	0.0558	(0.0519)	0.0307	(0.108)
2004q3	0.0104	(0.0382)	0.0769	(0.0984)	0.0817	(0.0489)	0.00570	(0.107)
2004q4	-	-	-	-	-	-	-	-
2005q1	0.00639	(0.0405)	0.0396	(0.0581)	0.168***	(0.0381)	-0.122**	(0.0579)
2005q2	0.156***	(0.0431)	-0.227***	(0.0748)	0.192***	(0.0468)	-0.263***	(0.0794)
2005q3	0.251***	(0.0509)	-0.363***	(0.0922)	0.273***	(0.0585)	-0.386***	(0.0996)
2005q4	0.198***	(0.0399)	-0.298***	(0.0562)	0.297***	(0.0628)	-0.398***	(0.0753)
2006q1	0.221***	(0.0487)	-0.285***	(0.0745)	0.335***	(0.0816)	-0.399***	(0.101)
2006q2	0.295***	(0.0415)	0.154	(0.214)	0.343***	(0.0692)	0.106	(0.230)
2006q3	0.299***	(0.0517)	-0.332***	(0.106)	0.338***	(0.0609)	-0.371***	(0.115)
2006q4	0.367***	(0.0484)	-0.370***	(0.0766)	0.412***	(0.0642)	-0.415***	(0.0894)
2007q1	0.441***	(0.0520)	-0.425***	(0.0889)	0.598***	(0.165)	-0.582***	(0.181)
2007q2	0.485***	(0.0549)	-0.552***	(0.193)	0.587***	(0.0718)	-0.654***	(0.207)
2007q3	0.534***	(0.0517)	-0.558***	(0.185)	0.644***	(0.0935)	-0.668***	(0.209)
2007q4	0.525***	(0.0616)	0.0580	(0.220)	0.583***	(0.0791)	0.000834	(0.235)
2008q1	0.538***	(0.0562)	-0.546***	(0.185)	0.668***	(0.102)	-0.676***	(0.211)
Observations	4200				676			
R.-squared	0.965				0.973			

Note: Country dummies and constant term not reported. Standard errors are robust to heteroscedasticity and serial correlation

	Panel M				Panel N			
Banking Jur	Guernsey				Guernsey			
Treatment	EU15				EU15			
Control	NON-EU				OECD			
Currency	ALL				ALL			
	Time dummies (D_t)		Interaction terms (D_t*EU)		Time dummies (D_t)		Interaction terms (D_t*EU)	
	coefficient	se	coefficient	se	coefficient	se	coefficient	se
1995q4								
1996q1								
1996q2								
1996q3								
1996q4								
1997q1								
1997q2								
1997q3								
1997q4								
1998q1								
1998q2								
1998q3								
1998q4								
1999q1								
1999q2								
1999q3								
1999q4								
2000q1								
2000q2								
2000q3								
2000q4								
2001q1								
2001q2								
2001q3								
2001q4	0.133	(0.232)	-0.393	(0.303)	0.157	(0.377)	-0.417	(0.427)
2002q1	0.0129	(0.202)	-0.320	(0.289)	-0.110	(0.149)	-0.197	(0.260)
2002q2	0.0138	(0.191)	-0.214	(0.272)	-0.111	(0.122)	-0.0898	(0.233)
2002q3	0.0229	(0.195)	-0.318	(0.266)	-0.107	(0.113)	-0.188	(0.217)
2002q4	-0.0272	(0.190)	-0.211	(0.265)	-0.262***	(0.0613)	0.0233	(0.199)
2003q1	-0.0379	(0.188)	-0.212	(0.255)	-0.227***	(0.0496)	-0.0225	(0.185)
2003q2	-0.0508	(0.190)	-0.256	(0.254)	-0.233***	(0.0633)	-0.0744	(0.184)
2003q3	-0.0520	(0.186)	-0.101	(0.201)	-0.218***	(0.0518)	0.0653	(0.0924)
2003q4	0.0639	(0.190)	-0.152	(0.199)	-0.169***	(0.0591)	0.0814	(0.0830)
2004q1	0.0435	(0.162)	-0.0852	(0.177)	-0.166***	(0.0590)	0.125	(0.0943)
2004q2	0.0709	(0.156)	-0.156	(0.165)	-0.104*	(0.0522)	0.0196	(0.0757)
2004q3	-0.0748	(0.0557)	0.00768	(0.0711)	-0.0936***	(0.0310)	0.0265	(0.0550)
2004q4	-	-	-	-	-	-	-	-
2005q1	-0.0118	(0.0267)	-0.0297	(0.0489)	-0.0358	(0.0359)	-0.00565	(0.0554)
2005q2	-0.00902	(0.0386)	-0.161**	(0.0675)	-0.0683	(0.0559)	-0.101	(0.0797)
2005q3	0.0327	(0.0865)	-0.275**	(0.111)	0.0937	(0.138)	-0.337**	(0.155)
2005q4	0.0939	(0.105)	-0.316**	(0.133)	0.198	(0.128)	-0.420**	(0.153)
2006q1	0.0825	(0.109)	-0.219*	(0.121)	0.0571	(0.0623)	-0.194**	(0.0815)
2006q2	0.122	(0.118)	-0.231	(0.149)	0.0583	(0.0649)	-0.167	(0.113)
2006q3	0.153	(0.116)	-0.236*	(0.138)	0.0498	(0.0694)	-0.132	(0.104)
2006q4	0.145	(0.110)	-0.141	(0.132)	0.241**	(0.0937)	-0.238*	(0.120)
2007q1	0.263*	(0.145)	-0.473	(0.308)	0.534	(0.376)	-0.745	(0.468)
2007q2	0.290**	(0.140)	-0.465	(0.314)	0.551	(0.373)	-0.726	(0.471)
2007q3	0.289**	(0.142)	-0.375	(0.324)	0.526	(0.378)	-0.611	(0.482)
2007q4	0.317**	(0.148)	-0.467	(0.321)	0.522	(0.378)	-0.672	(0.478)
2008q1	0.271*	(0.157)	-0.344	(0.329)	0.553	(0.397)	-0.626	(0.496)
Observations	1021				554			
R.-squared	0.943				0.944			

Note: Country dummies and constant term not reported. Standard errors are robust to heteroscedasticity and serial correlation

	Panel O				Panel P			
Banking Jur	Isle of Man				Isle of Man			
Treatment	EU15				EU15			
Control	NON-EU				OECD			
Currency	ALL				ALL			
	Time dummies (D_t)		Interaction terms (D_t*EU)		Time dummies (D_t)		Interaction terms (D_t*EU)	
	coefficient	se	coefficient	se	coefficient	se	coefficient	se
1995q4								
1996q1								
1996q2								
1996q3								
1996q4								
1997q1								
1997q2								
1997q3								
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2000q3								
2000q4								
2001q1								
2001q2								
2001q3								
2001q4	-0.296**	(0.123)	-0.333*	(0.194)	-0.493***	(0.0502)	-0.136	(0.162)
2002q1	-0.359***	(0.0838)	-0.148	(0.140)	-0.423***	(0.0657)	-0.0833	(0.133)
2002q2	-0.262***	(0.0852)	-0.129	(0.137)	-0.335***	(0.0601)	-0.0563	(0.126)
2002q3	-0.332***	(0.0704)	0.0352	(0.124)	-0.318***	(0.0571)	0.0209	(0.119)
2002q4	-0.231***	(0.0690)	-0.0589	(0.102)	-0.279***	(0.0570)	-0.0105	(0.0958)
2003q1	-0.277***	(0.0860)	-0.0422	(0.109)	-0.368***	(0.0734)	0.0491	(0.101)
2003q2	-0.112	(0.104)	-0.0144	(0.136)	-0.189**	(0.0875)	0.0624	(0.126)
2003q3	-0.162**	(0.0715)	-0.0118	(0.0958)	-0.153*	(0.0831)	-0.0208	(0.106)
2003q4	-0.168***	(0.0524)	-0.0168	(0.0626)	-0.182**	(0.0660)	-0.00270	(0.0748)
2004q1	-0.0768	(0.0627)	-0.0468	(0.0703)	-0.0802	(0.0722)	-0.0434	(0.0791)
2004q2	-0.133***	(0.0342)	0.00567	(0.0448)	-0.115**	(0.0435)	-0.0122	(0.0527)
2004q3	-0.0897***	(0.0264)	0.00412	(0.0328)	-0.101**	(0.0409)	0.0159	(0.0455)
2004q4	-	-	-	-	-	-	-	-
2005q1	0.139*	(0.0723)	-0.139	(0.0941)	0.0297***	(0.00977)	-0.0295	(0.0625)
2005q2	0.0521	(0.0713)	-0.117	(0.0913)	0.0262	(0.0248)	-0.0908	(0.0635)
2005q3	0.0435	(0.0869)	-0.388**	(0.160)	-0.0928	(0.0849)	-0.252	(0.162)
2005q4	0.113	(0.0980)	-0.415**	(0.179)	-0.0234	(0.0836)	-0.279	(0.175)
2006q1	0.178*	(0.0953)	-0.454**	(0.177)	0.0204	(0.0760)	-0.297*	(0.170)
2006q2	0.238*	(0.131)	-0.458**	(0.202)	0.0761	(0.0782)	-0.296	(0.176)
2006q3	0.0996	(0.234)	-0.327	(0.289)	-0.367	(0.414)	0.139	(0.448)
2006q4	0.394***	(0.143)	-0.651***	(0.226)	0.0561	(0.105)	-0.313	(0.209)
2007q1	0.391**	(0.144)	-0.544**	(0.217)	0.137	(0.102)	-0.291	(0.196)
2007q2	0.422***	(0.145)	-0.466*	(0.234)	0.162	(0.109)	-0.206	(0.217)
2007q3	0.567***	(0.172)	-0.516*	(0.268)	0.215*	(0.114)	-0.165	(0.239)
2007q4	0.569***	(0.168)	-0.616**	(0.246)	0.237*	(0.124)	-0.284	(0.221)
2008q1	0.570***	(0.154)	-0.502*	(0.252)	0.284**	(0.126)	-0.216	(0.240)
Observations	754				520			
R.-squared	0.964				0.971			

Note: Country dummies and constant term not reported. Standard errors are robust to heteroscedasticity and serial correlation