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WORKING PAPER

The Effectiveness of Tax Incentives in Attracting FDI: Evidence from the Tourism Sector in the Caribbean

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The Effectiveness of Tax Incentives in Attracting FDI: Evidence from the Tourism Sector in the Caribbean

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Abstract:

We investigate to what extend tax incentives have been effective in attracting Foreign Direct Investment in the tourism sector in the Caribbean in the period 1997-2007. More precisely, we test whether the neoclassical investment theory prediction that tax incentives, by lowering the user cost of capital, raise investment, holds in the Eastern Caribbean Currency Union (ECCU). We use differences in difference to assess the impact of an important change in tax incentives for tourism investment in Antigua and Barbuda in 2003. The other ECCU countries serve as excellent control group countries since the small islands share the same currency, coordinate macroeconomic policies to some extent, have similar geographical characteristics, and compete for the same big international tourism corporations.
Accounting for other factors driving tourism FDI in this region, we find that tourism investment in Antigua and Barbuda after 2003 increased significantly more than investment in the other six ECCU countries due to the tourism tax incentives reform.
This study is one of the first to assess the impact of sector specific tax incentives on investment in developing countries. Moreover, while previous studies relied on cross sectional differences, our differences in difference approach offers a cleaner way to identify the effect of the tax incentives policy.

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1. Introduction

Tax incentives are popular fiscal instruments to attract investment in developing countries. International institutions such as the IMF and the World Bank have generally advised against the more favorable treatment of certain economic activities as compared to what is granted to the general industry. The main reasons brought forward against the use of incentives are (i) the economic cost - incentives for some but not for all disturb the efficient allocation of capital -, (ii) the cost from revenue foregone through the granting of tax concessions and exemptions, (iii) the costs of administering the incentives and (iv) the social costs related to corruption, especially when tax incentives are granted on a discretionary basis rather than automatically[1]. The main argument that countries using tax incentives, and especially the smaller ones, put forward is that the incentives are necessary as a means to attract economic activity in an increasingly competitive world. This argument relies on the theoretical predictions that small open economies, for which mobile capital is highly price- (or tax-) elastic, have little power to levy taxes on capital income. It is for this reason that also the small member states of the Eastern Caribbean Currency Union (ECCU) have made extensive use of tax incentives.

In the ECCU, tax incentives have primarily been granted to induce investment for the manufacturing industry and for the tourism industry. An important concern within the Caribbean is that the small countries are not only competing for investment with the rest of the world but also with each other. In order to prevent Caribbean countries to be dragged into a race to the bottom among themselves, almost all CARICOM states (and all ECCU states) decided to harmonize the fiscal incentives by signing the Agreement on the Harmonization of Fiscal Incentives to the Industry/Manufacturing Sector in 1973. However, although implemented for the manufacturing sector, no harmonization has been established of tax incentives in the tourism sector.

[1] Good overviews on the costs and benefits of tax incentives can be found in Shah (1995), OECD (2001), Zee, Slotsky and Ley (2002), and Klemm (2009).

Tourism, however, is an important contributor to economic activity in the Eastern Caribbean Currency Union (ECCU)[2]. According to a recent IMF country report (2008) on the ECCU, the union is even increasingly dependent on tourism and the current economic expansion has been driven by construction investment to boost tourism capacity in many member countries. The importance of investment in the tourism sector for the whole economy stems from the share of tourism investment in total direct investment[3]. This ranges from 25.9 % in Dominica to 89.3% in St Vincent and the Grenadines over the period 1997-2007 (see table 1). In this context, tax incentives to the tourism sector and competition using them may have important consequences for the whole economy and certainly deserves a closer examination. Moreover, a recent FIAS (2004) study, gauging the relative importance of a large number of factors that could potentially influence foreign investors' location decisions in the Caribbean region, finds that investment incentives are among the investment climate factors considered important in the tourism sectors, more so than in other sectors.

In this paper, we investigate to what extend the tax incentives for tourism investment in the ECCU are effective in attracting tourism investment. We do so by looking at changes in tax incentives for tourism in seven ECCU member states[4] over the period 1997-2007. The major change happened in Antigua and Barbuda in 2003 when corporate income tax exemptions for tourism companies were extended from a maximum of five to a maximum of twenty five years. This change provides a policy experiment that we evaluate using a difference in difference approach. We compare the difference between tourism investment in Antigua and Barbuda, and the other ECCU countries before the policy change in Antigua and Barbuda happened, with the difference after the policy change happened. To be sure that it is the tax incentives policy change that drives the results we take care of other potential factors driving tourism investment in the ECCU.

[2] hotels and restaurants accounted for 9.3 % of GDP of the ECCU in the period 1997-2007, ranging from around 2.3% in St Vincent to around 32% in Anguilla (see table 1). This figure does not include construction, which share of GDP rose from 10% to 15.3% between 1997 and 2007, of which a big deal comprises tourism construction.

[3] The investment is defined as equity and other investment, which excludes reinvestments and land sales.

[4] The seven member states we investigate are Anguilla, Antigua and Barbuda, Dominica, Grenada, St Kitts and Nevis, St Lucia and St Vincent and the Grenadines. Montserrat was left out of the analysis for lack of data and lack of tourism activities.

We find that tourism investment in Antigua and Barbuda after 2003 increased significantly more than investment in the other six ECCU countries. Even when controlling for other factors such as the beneficial effects to tourism investment from the organization of the Cricket World Cup in 2007 in five of the countries including Antigua and Barbuda the results remain robust.

This paper contributes to the current literature on tax incentives in developing countries in several ways. First, compared to previous literature on tax incentives in the ECCU, we are the first to use panel data with fixed effects. As a result we are able to look at the impact of changes in tax incentives *within* a country rather than only looking at *cross* country differences to explain differences in investment, such as in Chai and Goyal (2008). Also we directly assess the link between incentives and investment rather than calculating Marginal Effective Tax Rates (METRs) as in Sosa (2006). METRs are useful to assess the impact of tax incentives on the cost of capital but do not give you the impact of incentives on the actual investment outcome. Second, as compared to previous studies establishing the link between tax incentives and investment in developing countries, the ECCU members offer an excellent playing field to assess the impact of incentives because of the similarities of the countries. The seven countries we adopt in the analysis are all small Islands with similar geographical characteristics, especially for tourism purposes. Moreover, sharing the same currency and monetary policy and to some extent coordinated macroeconomic policies, they are also economically comparable. The homogeneity of the islands is an important condition for doing difference in difference analysis. Third, we are able to look at sectoral investment data while previous studies, such as Klemm and Van Parys (2009) had to rely on aggregate investment data. Being able to match sectoral tax incentives with sectoral investment data obviously helps to more accurately measure the effects.

In section two we review the relevant literature. Section three explains how similar the investigated countries are and how their tourism tax incentives and investment evolved.

The methodology and results of the empirical analysis are described in sections four and five and we conclude and discuss the results in section six.

2. Literature

Three streams of literature are relevant to this study: (i) the theoretical literature on tax competition and the relationship between corporate taxation and investment, (ii) the empirical literature on tax incentives and investment in the Caribbean and (iii) the literature on the use of the differences in difference methodology for assessing (tax) policy decisions.

2.1. Theoretical literature

In the basic tax competition model[5] of Zodrow and Mieszkowski (1986), in a world where capital is perfectly mobile, labor is immobile, and only capital is taxed, similar countries compete for the mobile capital by lowering their capital tax rates to suboptimal levels. The reason is that in case of internationally mobile capital, raising the capital tax rate involves an extra cost, the outflow of the capital tax base to other countries. Bucovetsky (1991) and Wilson (1991) extend this model for asymmetric competition between a large and a small country. They find that the large country can afford to levy a higher tax rate than the small country because the large country's tax base is less sensitive to changes in the tax rate. In more recent New Economic Geography models[6], with monopolistic rather than perfect competition, agglomeration forces encourage economic activity to concentrate in the core region. The attractiveness of the concentration of capital in the core, allows 'core' countries to set higher tax rates than 'periphery' countries with no concentration of capital. These theoretical findings provide rationale for why small countries in peripheral regions, such as the ECCU countries, are setting lower tax rates to attract investment.

[5] For an overview of tax competition theories, see Wilson (1999)
[6] See for example Baldwin and Krugman (2004)

Yet, this provides no theoretical argument for using tax incentives, i.e. favoring certain economic activities or sectors over others, rather then lowering general corporate taxation. However, in more complex models of tax competition, with more than one single policy instrument to tax capital, the use of tax incentives next to the general tax regime can be beneficial. Keen (2002) for example argues that targeting reduced tax rates at the most mobile activities may be rational if not all capital is equally mobile, because only lowering the tax rate to the most mobile activities rather than all activities reduces the revenue lost[7]. Against this background, we can understand why in the 1973 Harmonization Agreement, the Caribbean countries allow for larger tax concessions to 'enclaves', companies that export hundred percent of their production, since such companies are likely to be more mobile.

An important assumption underlying all tax competition models is that the demand for capital negatively depends on the cost of capital, including the tax on capital. This assumption goes back to the neoclassical investment theory, pioneered by Jorgenson (1963), where firms, characterized by decreasing returns on capital, invest up to the point where the net present value of the capital equals the costs. In this paper, we test the assumption that a reduction in the cost of capital, through the extension of tax incentives, raises the demand for capital. Or translated to this study, whether increasing tourism incentives helped to attract more tourism investment.

2.2. Empirical literature

Several authors have shed their light on the controversial issue of tax incentives in the Caribbean. Sosa (2006) and Nassar (2008) assess the impact of the tax regimes on investment in Caribbean countries by respectively calculating METRs and Average Effective Tax Rates (AETRs) for different countries[8]. When taking account of the tax holidays, Sosa (2006) finds METRs for the tourism sector in the ECCU that are either

[7] Klemm (2009) provides an interesting overview of the role of tax competition models for tax incentives.
[8] METRs are relevant for analyzing whether the threshold of profitability has been shifted by the tax system, i.e. it relates to projects that just break even. The AETR, however, is a broader measure since it is developed for different levels of expected economic profit, allowing an impact analysis varying with the profitability of the investment (Klemm and Danninger (2006)).

close to zero or even negative, turning it into a subsidy. Nassar (2008) finds that AETRs for the general industry in 15 Caribbean countries have declined between 1985 and 2005, pointing to the impact of fiercer tax competition due to higher capital mobility. The calculation of effective tax rates is valuable because it measures the impact of (changes in) tax regimes on the user cost of capital and as such indirectly measures the impact of tax incentives on investment. However it does not investigate whether the lower user cost of capital has an impact on the real investment outcome[9], which is a gap we want to fill with this paper.

While the above authors measure how beneficial tax incentives are for the cost of capital, Bain (1995) and Chai and Goyal (2008) have calculated how costly they are in terms of revenue foregone. Bain estimates the revenue loss from tax concessions in the ECCU from 23.5% in Anguilla to 53.9% in Grenada. Chai and Goyal (2008) calculate that on average the ECCU countries would gain revenues as big as 9.1% of GDP when tax concessions would be removed. Chai and Goyal (2008) also attempt to estimate the benefits of tax concessions in terms of FDI. For this purpose they use a cross country analysis, which is vulnerable since it is hard to account for all non-tax country characteristics that simultaneously influence FDI. Instead, we are convinced that our approach, analyzing changes in tax incentives within a country offers more reliable framework for estimation.

2.3. Methodological literature

To estimate the impact of tax incentives on investment, we draw on the literature that uses policy experiments to evaluate the impact of a policy on a certain outcome variable. This incidence analysis uses observations of a treatment group that is affected by the policy change (experiment) and compares it with observations of a control group, either within or across states, that is not affected by the policy change. The effect of the policy is then estimated from the difference in the outcomes between the treatment and control

[9] For more arguments on the use of METRs and AETRs for assessing the impact of tax incentives on investment, see for example Shah (1995) p58-59.

group before and after the policy change, hence the term 'differences in difference' analysis. This methodology has become increasingly popular to offer a clean way of identifying the effect of a policy[10].

Some scholars have used this methodology to evaluate tax policies. Cummins, Hassat and Hubbard (1994) use firm level data for the United States over the period 1953-1988 and episodes from major tax reforms to estimate the effect of corporate taxation on firm level investment. They find a significant and robust negative effect of corporate taxation on investment. More recently, House and Shapiro (2008) use reforms of corporate taxation in the United States in 2002 and 2003, which temporarily increased depreciation allowances, and also find a negative effect of the tax adjusted user cost on investment at the sector level.

3. Institutional background and data

3.1. The ECCU

The Eastern Caribbean Currency Union comprises the independent states Antigua and Barbuda, Dominica, Grenada, St Kitts and Nevis, St Lucia, St Vincent and the Grenadines and two territories of the UK, Anguilla and Montserrat. We leave Montserrat out of the analysis because of the lack of data on tourism investment which goes along with the shortage of tourism activity in comparison with the other ECCU members.

The ECCU countries[11] share a common currency, the Eastern Caribbean dollar, which has been pegged to the US dollar since 1976[12]. Monetary policy is conducted by the common and independent Eastern Caribbean Central Bank (ECCB), which preserves exchange rate and price stability and fosters financial development.

The six independent nations and Montserrat are also member of the Caribbean Common Market, CARICOM, established in 1973. Through the CARICOM Treaty the members

[10] For an overview of natural experiments in economics, see Meyer (1995). Besley and Case (2000) consider remedies to the possible pitfalls of this methodology.
[11] Also referred to as OECS (Organization of Eastern Caribbean States) countries.
[12] At EC dollar 2.70= US dollar 1.

are determined to work toward establishing a single market and economy (CSME) and intend to "converge macroeconomic performance and policies through the coordination or harmonization of monetary and fiscal policies, including … policies relating to tax structures[13]". However, macroeconomic policy coordination has to date been rather weak. With respect to the harmonization of tax incentives, the original CARICOM Treaty of Chaguaramas was translated into an Agreement on the Harmonization of Fiscal Incentives to the Industry/Manufacturing Sector. Though, this agreement is used rather as a starting point in negotiations with multinationals, with large investors insisting on more generous packages on a discretionary basis (IMF Article IV, 2005). Importantly, tourism tax incentives were not included in this harmonization process.

Table 1 shows some basic economic statistics for the ECCU. ECCU members are small middle income countries with populations between 49,000 in St Kitts and 168,000 in St Lucia and an average GDP per capita of 5,717 USD in 2007. Despite their economic links, per capita income differs from 3,573 USD in Dominica to 13,323 USD in Anguilla (see table 1). During the 70s and 80s there has been a steady shift away from agriculture to services, particularly government, tourism and financial services. The erosion of trade preferences in the 90s contributed to the decline of traditional exports (such as bananas and sugar). Over the investigated period 1997-2007 the share of 'Hotels and Restaurants' in GDP has remained stable at a high 9 % of GDP, while agriculture fell back to only 5%. Construction, much of it serving the needs of tourism, saw its share grow from almost 10% in 1997 to more than 15% of GDP in 2007.

A closer look at the evolution of GDP and the contribution of tourism to it reveals some interesting patterns we have to be aware of when analyzing the impact of tax changes on tourism investment. First, we have to be aware of the vulnerability of the ECCU economies. The extremely small size of the economies limits the scope for diversification. The high reliance on tourism makes the economies particularly vulnerable to the world business cycle and shocks to global security, as became apparent after the

[13] See The Revised Treaty of Chaguaramas , CARICOM 2005, p443

terrorist attacks of September 11th 2001[14]. Graph A1 (see Appendix) demonstrates that in all investigated countries growth fell and became even negative in a few in 2001 and the years after. This dip is particularly apparent in the contribution of 'Hotels and Restaurants' to GDP (graph A3) and in the stagnation of Construction (graph A4) in the years after 2001. Because the exposure to the global economy affects countries equally, this does not pose an immediate problem to our analysis since we account for time fixed effects. We are more concerned with the exposure of ECCU countries to natural disasters that have a country-specific impact. Graph A1 and A2 clearly reveal the impact of hurricane Ivan on Grenada in 2004, reducing the size of the economy by more than 5%[15]. In 2005 the economy grew sharply thanks to the construction boom (graph A4) to restore the devastated houses but despite a drop in consumption in hotels and restaurants (graph A3). Finally, also the organization of the 2007 Cricket World Cup in five ECCU countries[16] had a positive impact on growth in 2006 and 2007.

The similar institutional, economic and geographical characteristics of the ECCU members offer us a unique level playing field to measure the impact of changes in tax regimes on tourism investment. The investigated countries are all islands promoting tourism, they are endowed with sand sea and sun, they share the same currency and to a certain extend coordinate macroeconomic policies and they target the mobile capital of hotel industries in North America and Europe. At the same time we are aware of the impact on investment of particular events that only affected some countries, such as the organization of the Cricket World Cup and natural disasters.

3.2. Tourism tax incentives

We obtained data on tourism tax incentives from the Price Waterhouse Coopers worldwide summaries of corporate taxes. These data were double checked using original Acts, and by contacting each country's Investment Promotion Agency. Table 2 shows the

[14] The risk beta for the global tourism sector rose sharply after the events (IMF, 2007 p93)
[15] And destroying nearly 90 percent of the housing stock in September 2004
[16] The five ECCU countries that hosted the World Cup are Antigua and Barbuda, Grenada, St Kitts and Nevis, St Lucia, St Vincent and the Grenadines

evolution of tax incentives in the seven ECCU members of our analysis. Of particular interest to us are the changes in incentives. The following changes are of interest. First and most important, Antigua and Barbuda extended the number of years of corporate income tax exemptions. Since 2003, the biggest accommodations can apply for a tax holiday of 25 years instead of 5 years previously. We capture this big change by the treatment variable Antigua2003, which is zero except for Antigua and Barbuda in the years after 2003. Second, the five countries that hosted the Cricket World Cup 2007 gave special incentives for accommodation related to the Cricket World Cup of 2007. These incentives did not alter the general tourism incentives regime and were only valid for a limited period, which is for 2006 and 2007. Because the increased demand for tourism in itself is a cause for new investment in the run-up to the World Cup, it is impossible to identify whether a rise in investment in 2006 and 2007 can be dedicated to the World Cup incentives or the World Cup event. As a result we define a dummy variable CricketWC2007 which is one for the five organizing countries (not Dominica and Anguilla) in the years 2006 and 2007, that captures both the effect of the World Cup and the related extra incentives. Third, Grenada reduced its direct tax incentives in 2006 by converting a 10 year income tax exemption to a 100% investment allowance for capital investment for a period of 10 years. We control for this change by adopting a dummy variable Grenada2006, which is one for Grenada after 2006. We contacted the Investment Promotion Agencies of each country to make sure that no other important investment climate changes occurred during the investigated period. We were told that there weren't.

3.3. Tourism and non tourism investment

We obtained Foreign Direct Investment (FDI)[17] data by sector for the period 1997-2007 for all ECCU countries, except Montserrat, by the ECCB[18]. The FDI data by sector concern only equity and investment other than reinvested earnings and land sales. Because, except for tourism, not all sectors are represented in each country, we divide the FDI data in two sectors: tourism investment and non tourism investment.

[17] FDI is defined conform to the Balance of payments Manual 5 (BPM5) of the IMF.
[18] We are grateful to Gordon Manning and Prunella Charles-William for providing the data.

Table 1 shows that Tourism investment represents the lion share of investment in the ECCU countries, totaling on average between 25% of investment in Dominica and almost 90% in St Vincent and the Grenadines. Looking at the evolution of tourism FDI in graph 1 reveals interesting patterns that justify a thorough econometric analysis in the next session. Parallel to the observation 'Hotels and Restaurant' services dropped in 2001 and thereafter, we also see a stagnation of overall tourism investment in the period 2001-2003. The upper panel of Graph 1 demonstrates that individual country performances differ, but only Granada gained investment over this period. Second, we observe a rising trend in overall tourism investment since 2004. In particular, Antigua and Barbuda and to lesser extend St Lucia and Grenada are responsible for this. If we look at lower panel of graph 1, where tourism FDI in Antigua and Barbuda is set off against the average tourism FDI in the other six ECCU countries, we see that the rise in Antigua and Barbuda starts in 2004 compared to 2006 for the other countries. This evolution suggests that the increase in tax incentives for tourism investment in Antigua and Barbuda in 2003 (indicated by the vertical line), could be responsible for this early rise in Antigua and Barbuda. The steep jump in all countries in 2006 and 2007 is probably explained by the run up to the organization of the Cricket World Cup 2007 in five of the seven countries. Other factors such as the recovery of Grenada after Hurricane Ivan in 2004 and the global business cycle should also be taken into account. Each of these will be addressed in the empirical analysis in the next section.

In order to explain the performance of tourism investment, it is interesting to compare it with the performance of non tourism investment (see graph A5 in Appendix). The performance of non tourism investment is much more volatile, except for the rising trend after 2004 in Dominica and Grenada. The difference in performance between tourism and non tourism investment suggests that the factors responsible for the trends in tourism investment are specific to tourism investment rather than to investment in general.

4. Methodology

A policy experiment offers a clean way of identifying the impact of a policy on the outcome variables. In this sense, the important change in tourism tax incentives in Antigua and Barbuda is an interesting policy experiment to evaluate the impact of tax incentives on tourism investment. A perfect policy experiment would be one in which you have two identical countries of which one undergoes the policy change and the other does not. In that case the 'all else equal' assumption would be perfectly met and it would suffice to calculate the difference in investment between the two countries after the policy change. This approach is in contrast with cross sectional analysis where the impact of a policy on the outcome variable is measured using the variation of the policy over the countries. The problem with cross sectional analysis is often that the 'all else equal' assumption does not hold due to omitted variables or country selection bias. Instead, looking at variation over time within a country and carefully selecting the countries allows to more accurately estimating the impact of a policy.

Obviously, the perfect policy experiment does not exist in the real world because two countries are never identical. By selecting the seven ECCU countries of which the similarities are extensively discussed in the previous section, we are able to construct a valuable control group for Antigua and Barbuda. Yet, we have to take account of the imperfections that could thread the validity of the causal interpretation.

First, an identification problem could occur due to omitted variables that are correlated with the change in tax incentives and the investment outcome. These omitted determinants of tourism FDI could be categorized in three groups: (i) the time varying determinants that affect investment in all countries similarly (year fixed effects), (ii) time invariant country characteristics (country fixed effects), and (iii) country specific characteristics that vary over time. This gives the following specification:

$$TourismFDI_{it} = \alpha + \beta Antigua2003_{it} + \lambda_t + \mu_i + \gamma X_{it} + u_{it} \qquad (1)$$

Where i (i=1…7) denotes the country and t (t=1997…2007) the year. The coefficient β gives the sensitivity of tourism FDI to the change in tourism incentives in Antigua and Barbuda. The year fixed effects λ_t cover for example the global business cycle that affects tourism FDI in all countries equally, such as the global downturn in the wake of the 9/11 attacks in 2001, or the exchange rate between the Eastern Caribbean dollar and other currencies in the world. The country fixed effects μ_i that affect tourism are for example the touristic geographical characteristics of the island that do not change over time but that differ between the islands such as the presence of volcanoes in St Kitts. Fixed effects also capture the long term average level of economic variables such GDP, GDP per capita, population etc. If any of these determinants of investment would be correlated with the tax incentives policy variable Antigua2003 and omitted, it would be hard to tell which determinant would be the real drivers of investment. The differences in difference approach controls for both the year and country fixed effects. In a simple differences in difference analysis with only two countries (treatment and control group) and two time periods (before and after the policy reform), you get rid of the country fixed effect by calculating the difference between the two countries in each time period, and you get rid of the year fixed effect by then taking the difference between these differences of each time period. Since we have six control countries apart from treatment country Antigua and Barbuda and 11 years (7 before and 4 after the policy change) getting rid of the year and country fixed effects is done like in panel data analysis: by demeaning over time and demeaning over the countries.

The vector X_{it} contains country specific characteristics that vary over time and that may be correlated with the change in tax incentives variable Antigua2003. The OECD (2007) identifies three areas that determine whether a host country offers attractive risk/return opportunities: framework conditions, market characteristics and location specific profits. The location specific amenities are already captured by the fixed location effects. The framework conditions, such as the stability of the political system, public governance, and the monetary system and fiscal framework are largely controlled for by the selection of the sample countries. Being former British Empire countries, sharing the same

currency and being members of the ECCU and CARICOM that promote macroeconomic policy coordination and a single market economy, we believe that the sample countries have very similar framework conditions. Concerning the market characteristics, the OECD (2007) distinguishes between the domestic market size, the labor force characteristics and the country's infrastructure. In case of tourism investment in tiny islands, the domestic market size is of very little or no importance. What counts is the international tourism market which is the same for all sample countries but varies over time, for example because of the business cycle. As a result it is part of the fixed year effects. With respect to the labor force, we can take account GDP per capita to proxy wages. Since our countries are highly dependent on tourism activity, the problem with GDP per capita is that the income level is endogenous. Because of this and because GDP per capita was not significant in the regressions that we tried, we drop it[19]. As far as the country's infrastructure is concerned, we have no variables available[20]. We partly dealt with this problem by contacting the Investment Promotion Agencies, asking whether there were important non tax incentives that could have had a big impact on investment. None were signaled. An extra robustness check consists of using the non tourism investment as the dependent variable instead of tourism investment. To the extent that infrastructure or non tax incentive policies would not be tourism specific but beneficial to all investment, and highly correlated with the tax reform in Antigua and Barbuda, also non tourism investment should be affected by the variable Antigua2003. This robustness check does not take account of infrastructure or investment policies specific to tourism investment, however. Finally, we control for the country specific events mentioned in the data section. The first and most important is the organization of the Cricket World Cup 2007, captured by the variable CricketWC2007. We control for the Cricket World Cup in two other ways. One is by limiting the sample to the five organizing countries, leaving out Dominica and Anguilla and the other is to limit the time period to two or three years after the tax reform, which is to 2005 or 2006. Another event of interest is the passage of hurricane Ivan in 2004, which was particularly devastating in Grenada, covered by

[19] Moreover we do not have data for Anguilla, which would further reduce the number of observations.
[20] Variables such as government expenditures, share of roads paved, telecommunications or electric power indicators, part of the World Development Indicators are only available for some countries and some years.

Ivan2004. Finally, we include the tourism incentives change in Grenada in 2006, Grenada2006.

Second, next to the identification problem, we have to take care of the possible simultaneity of the tax policy decision and the investment outcome. Just as investment is likely to react to the policy change, also the policy change could be a reaction to the amount of investment in the country. To overcome the estimation bias caused by this possible inverse relationship, we defined the variables Antigua2003 and Grenada2006 such that they only affect investment in the year after the change was implemented (see data section).

Finally, having dealt with the endogeneity issue of the policy variable, we are also aware of the possible serial correlation problem raised in Betrand, Duflo and Mullainathan (2004). The length of the time series, the correlated trend that is commonly observed between the policy variable and the outcome variable can lead to a standard error for estimated policy coefficient (β) that severely understates the true standard deviation. Following the advice of Betrand et al (2004), to solve this problem, one robustness check is to remove the time series dimension by averaging the data before and after the policy change and run specification (1) using the averaged variables in a panel with only two time periods.

5. Results

5.1. Baseline results

Table 3 presents the basic results of the estimation of equation (1). In the first five columns all seven ECCU countries are used. We find a very significant positive effect of the tax change in Antigua and Barbuda on Tourism FDI. On average the tourism incentives change raised tourism with 300,000 Eastern Caribbean dollars. This confirms the theoretical prediction that investment negatively relates to the user cost of capital. When controlling for the impact of the Cricket World Cup in 2006 and 2007 from

column two on, the positive impact persists, even though the Cricket World Cup also contributed significantly to tourism investment. Controlling for the impact of hurricane Ivan in Grenada in 2004 and for the change in incentives in Grenada in 2006, does not alter the picture, since none of these events enters significantly.

In column five we exclude Grenada from the analysis as another way to prevent hurricane Ivan and the Grenada tax reform to disturb the results. Again the impact of the and Barbuda reform remains. Finally in column six, we control for the impact of the Cricket World Cup by only including countries that hosted the World Cup, i.e. excluding Dominica and Antigua and Barbuda. Doing so, we assume that the World Cup had an equal impact on investment in all countries and is as such captured by the year fixed effects (which are not reported in the table). Even with 22 observations less we see that the impact of the tourism incentives reform in Antigua and Barbuda remains very significantly positive.

5.2. Limiting the time period to single out the Antigua and Barbuda reform

Next, we limit the time period in which we evaluate the tax reform in Antigua and Barbuda. Instead of using observations over the whole period 1997-2007, we limit the analysis to three years before and after the reform, i.e. the period 2001-2006, and to two years before and after the reform, i.e. 2002-2005. Doing so we are better able to single out the effect of the tax incentives change in 2003 and limit the possibility that other investment policies or determinants that happened years before or after the reform and that are correlated with it over a long period interfere with the tourism incentives reform we are focusing on. For example, by eliminating first 2007 and then 2006, we limit the impact of the Cricket World Cup on the estimation results. Table 4 shows the results. The first five columns give the estimation results focusing on the period 2001-2006. In columns one to three, where we use all seven countries, we still find significant results of for the Antigua and Barbuda tax reform, be it with estimated coefficients lower β s between 2.31 and 2.46 and at the 5 % level.

The impact of the Cricket World Cup remains positive but is not significant anymore when we leave out the year that the World Cup happened, 2007. In column 4 we exclude Grenada for the same reason as in table 6 but find similar results. In column 5 the Cricket World Cup variable is left out because we only use observations of organizing countries. Again the impact of the Antigua and Barbuda incentives change remains robust. In the final column 6 we only consider a four year time period around the tax reform. Note that this limits our number of observations to 28, and that we leave out the variable CricketWC2007 because this variable covers a period that is now out of the analyzed period. Limiting the effects of the change in tax incentives to two years after the reform causes the coefficient on the Antigua and Barbuda tax reform importantly to 0.99. Yet the coefficient remains significant at the 10% level. This is an important finding since it means that the tax reform had an impact irrespective of the organization of the Cricket World Cup. We think of three possible reasons why the effect is much stronger when including years after 2005 in the analysis. The first is statistical, which is that the loss of observations reduces the estimation efficiency. Second, investment might need more time to react to the new incentives and third, the Cricket World Cup might have enhanced the effect of the tax reform on tourism investment.

5.3. Averaging to deal with serial correlation

Bertrand et al (2004) found that difference in differences analysis may suffer from serial correlation which results in underestimation of standard errors (overestimation of t-statistics). In table 5 we show the results adopting their suggested procedure, which is to average the variables before and after the policy change, in our case before and after 2003 (where 2003 is part of the period before). This reduces the number of time period to two, and the number of observations to 14 when all seven countries are included in the analysis. In the first two columns we average over the whole period before and after the Antigua and Barbuda reform, in the third and forth column we average over the three years before and after the reform and in the last column we average the variables over the two years before and after the reform.

Over the whole period, the tax reform remains significant, be it at a lower significance level of 5% instead of 1%. When reducing the sample to the World Cup countries the impact remains significant at the 10% level, although the number of observations drops to 10. Given the low number of observations this finding suggests that the impact of the Antigua and Barbuda incentives reform is robust to the serial correlation in the t-statistics. Limiting the time period to three years before and after the reform, the impact of the tax reform only remains significant for tourism investment in column three at the 10% level. In column four, the significance at the 10% level just disappears. Note however, that the number of degrees of freedom after reducing the number of observations becomes as low as 1 in column four, making it hardly possible to find significant results. The final column, only looking at two years before and after the reform, also reveals a positive but insignificant impact on tourism investment. As in the final column in table 7 this could either be due to the low number of observations or to the number of years the incentives reform needs to take full effect on investment.

5.4. Checking for robustness using non tourism investment

One could argue that we should control for more variables. We should be particularly careful not to oversee important changes in Antigua and Barbuda that happened at the same time as the change in tax incentives and that also impact investment. As long as these 'parallel' changes would be only relevant to tourism incentives and not to general investment, we would not be able to identify the real impact of these changes due to multicollinearity. However, we are able to identify the existence of 'parallel' changes that affect investment in general (and not only tourism). If general investment climate changes have driven investment in Antigua and Barbuda since 2003, than the Antigua2003 variable should also be relevant to non tourism investment. We investigate whether this is the case in table 6, which repeats the analysis of table 3 but using non tourism instead of tourism investment as the dependent variable. We find that in none of the regressions the variable Antigua2003 has an effect on non tourism investment. This confirms that the changes that have driven tourism investment in Antigua and Barbuda after 2003 must be tourism specific. This does not rule out the possibility that other

tourism specific policy changes than the change in tax incentives have driven tourism investment but it rules out the possibility that it was only the general investment climate that drove tourism investment.

6. Conclusion and discussion

Tax incentives are widespread among the Caribbean Islands. Opponents of tax incentives stress their costs in terms of economic efficiency, revenue foregone, administration and corruption. Policy makers defend them arguing that tax incentives are necessary and beneficial, especially for small countries, in attracting investment in an increasingly competitive and globalized world. Generally, there is a lack of empirical evidence on the costs and benefits of tax incentives. We try to partly fill that gap by looking at the extent to which tax incentives for tourism investment have been effective in attracting tourism investment.

We do so in a unique setting. The seven countries of our analysis share the same currency and monetary policy, coordinate to some extend their macroeconomic policy, are all very small, have similar geographical characteristics that attract tourism and as such constitute a unique level playing field for tax competition. The policy experiment in Antigua and Barbuda in 2003, where tax incentives for the tourism sector were extended importantly, gives us the opportunity to evaluate the effectiveness of tax incentives to investment in a clean way, using the other countries as a control group.

We find that tourism investment in Antigua and Barbuda after 2003 increased significantly more than investment in the other six ECCU countries. Even when controlling for the beneficial effects to tourism investment from the organization of the Cricket World Cup in 2007 in five of the countries including Antigua and Barbuda, the results hold. When we limit the investigated period to two years before and after the Antigua and Barbuda reform, we see the significance of the positive impact of the tax incentives decline. This could be either due to the decreasing number of observations, or because investment needs more time to fully react on the incentives change. A robustness

check rules out the possibility that the boost in tourism investment is due the amelioration of the general investment climate rather than an improvement in the tourism specific investment climate.

This result confirms that investment reacts to a fall in the user cost of capital, as predicted by the neoclassical investment theory, and as such approves that tax competition is an issue. This does not mean however that the total welfare picture of the introduction or increase of tax incentives is positive. This study only looks at the benefits of tax incentives and not at the costs. Moreover, since tax competition is working here it may lead to suboptimal tax levels for all countries. The ECCU countries face the choice between two options: undercutting each other and try to attract more tourism investment than the other or coordinate or harmonize tourism tax incentives to a level that is higher and more optimal for all. The importance of competition for tourism investment in these countries combined with the fact that the investigated countries have geographical amenities that are uniquely attractive in the world makes the case for the latter option much bigger. It suggests that these countries are competing with each other rather than with the rest of the world. By harmonizing their tax regimes for tourism investment they would circumvent the regional competition and still attract investment from the rest of the world even at higher tax rates. Critical is of course that all Caribbean countries, also outside the ECCU, have to be willing to cooperate in this tax harmonization.

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Table 1: socio-economic characteristics of ECCU members (except Montserrat), 2007.

	Anguilla	Antigua & Barbuda	Dominica	Grenada	St. Kitts and Nevis	St. Lucia	St. Vincent and The Grenadines
Pop (thousands), 2007	13.7	84.8	72.8	108.1	48.8	168.0	120.3
GDP (million USD current prices), 2007	183	916	260	485	426	788	454
GDP per capita (USD current prices), 2007	13,323	10,804	3,573	4,483	8,731	4,690	3,776
Average real GDP growth 97-07 (%)	8.6	5.7	0.8	4.2	3.1	2.4	4.5
Tourism services as percent of GDP, 97-07	31.8	10.8	2.7	8.0	7.6	13.3	2.3
Tourism FDI as percent of total FDI, 97-07	88.4	55.9	25.9	65.2	69.9	70.0	89.3

Source: ECCB (national accounts, Tourism FDI) and WEO (population)

Table 2: the evolution of tourism tax incentives in the ECCU, 1997-2007.

Country	Tax regime	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Anguilla	direct tax incentives	no particular tourism incentives but overall zero income tax rate										
	indirect tax incentives	> 10 bedrooms: exemption from custom duties and pier dues (usually 10-30%), on all building materials and other articles of hotel equipment for the construction and expansion of hotels.										
Antigua and Barbuda	indirect tax incentives	exemption from customs duties on all imports of building materials, machinery, equipment and furniture for the construction or extension (>10 bedrooms) of hotels										
	direct tax incentives	5 years income tax exemption, then 5 years Investment Allowance of 20% for capital expenditure						income tax exemption: 25 year (new and >100 rooms), 7 years (expansion of 30-49 rooms), 15 year (expansion of 50-99 rooms), 25 year (expansion of >100 rooms);				
	other tax incentives										Cricket World Cup Incentives Act*	
Dominica	indirect tax incentives	> 4 bedrooms: free of all custom duties for import of building materials or articles of equipment; waiver of VAT on direct imports on capital investment up to commencement of operation										
	direct tax incentives	> 4 bedrooms: max 20 years income tax exemption										
Grenada	indirect tax incentives	exemption from import duties and general consumption tax of hotel equipment and building materials										
	direct tax incentives	>9 bedrooms: up to 10 year income tax exemption									100% investment allowance for capital investment for a period of 10 years	
	other tax incentives										Cricket World Cup Incentives***	
St Kitts and Nevis	indirect tax incentives	exemption from import duties of building materials or hotel equipment										
	direct tax incentives	income tax exemption: 5years (<30 bedrooms), 10 years (>29 bedrooms)										
	other tax incentives										Cricket World Cup Incentives Act**	
St Lucia	indirect tax incentives	exemption of customs and consumption tax of building materials and equipment and fittings necessary for initial construction, furnishing or refurnishing of the property										
	direct tax incentives	income tax exemption: 15 years (new), 10 years (expansion)										
	other tax incentives										Cricket World Cup Incentives Act*	
St Vincent and the Grenadines	indirect tax incentives	exemption from customs duties and consumption taxes of building materials and hotel equipment										
	direct tax incentives	income tax exemption: 9 years (expansion 5-9 rooms), 10 (expansion 10-35), 15 (expansion >35), 10 (new 5-20), 12 (new 21-34), 15 (new >=35)										
	other tax incentives										Cricket World Cup Incentives***	

*: income tax exemption: 15 year (<50 rooms), 25 years (>50 rooms); relief on stampt duties, property taxes and non-citizen landholding licensing fees: 50 % (<50 rooms), 100% (>50 rooms); a percentage tax credit for financial institutions based on the amount of investment; waiver of customs duty and consumption tax on the imports of building materials, equipment, appliances, and vehicles used for the event

**: customs duty and consumption tax exemptions on imports of building materials, furniture or furnishings and appliances for a period to be determined by Cabinet; income tax exemption: 10 year (8-29 rooms), 15 year (>29 rooms)

***: not further specified

Table 3: regression results tourism FDI, 1997-2007.

	Dependent variable: Tourism FDI					
	(1)	(2)	(3)	(4)	(5)	(6)
	all countries				excl Grenada	excl Dominica and Anguilla
Antigua2003	3.147***	2.939***	2.973***	3.028***	3.002***	3.122***
	(4.98)	(4.72)	(4.76)	(4.80)	(4.48)	(4.22)
CricketWC2007		1.248**	1.263**	1.171*		
		(2.08)	(2.09)	(1.90)		
Ivan2004			0.877	0.962		
			(0.85)	(0.92)		
Grenada2006				0.854		
				(0.81)		
Constant	0.685*	0.685*	0.685*	0.685*	0.766*	0.855*
	(1.94)	(2.00)	(1.99)	(1.99)	(1.96)	(1.81)
Observations	77	77	77	77	66	55
R-squared	0.56	0.59	0.59	0.60	0.59	0.61
Number of countries	7	7	7	7	6	5
*** p<0.01, ** p<0.05, * p<0.1						
t statistics in parentheses						

Table 4: regression results tourism FDI, limited period 2001-2006 and 2002-2005.

	Dependent variable: Tourism FDI					
	(1)	(2)	(3)	(4)	(5)	(6)
	2001-2006					2002-2005
	all countries			excl Grenada	excl Dominica and Anguilla	all countries
Antigua2003	2.462**	2.312**	2.345**	2.214**	2.511**	0.993*
	(2.64)	(2.50)	(2.50)	(2.23)	(2.27)	(1.74)
CricketWC2007		1.354	1.375	1.726		
		(1.41)	(1.41)	(1.64)		
Ivan2004			0.640			
			(0.51)			
Constant	0.169	0.191	0.095	0.381	0.097	0.686***
	(0.40)	(0.46)	(0.21)	(0.85)	(0.17)	(3.18)
Observations	42	42	42	36	30	28
Number of countries	7	7	7	6	5	7
R-squared	0.45	0.48	0.49	0.52	0.50	0.22

*** p<0.01, ** p<0.05, * p<0.1
t statistics in parentheses

Table 5: regression results tourism FDI, average before and after Antigua2003 reform.

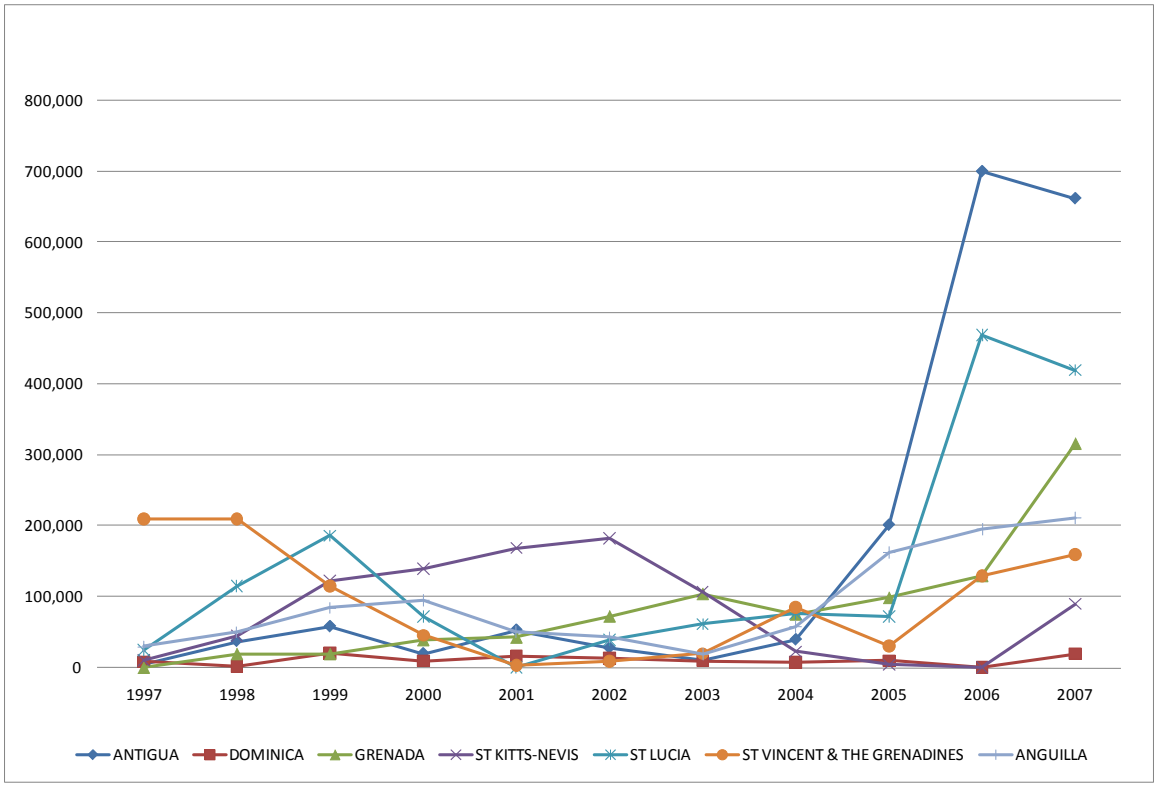
	Dependent variable: Tourism FDI				
	(1)	(2)	(3)	(4)	(5)
	av1997-2003 av2004-2007		av2001-2003 av2004-2006		av2002-2003 av2004-2005
	all countries	excl Dominica and Anguilla	all countries	excl Dominica and Anguilla	all countries
Antigua2003	3.147**	3.122*	2.462*	2.511	0.993
	(3.00)	(2.37)	(2.11)	(1.70)	(1.27)
Constant	0.583*	0.687	0.504	0.603	0.515**
	(2.25)	(1.85)	(1.74)	(1.44)	(2.66)
Observations	14	10	14	10	14
R-squared	0.77	0.78	0.60	0.62	0.28
Number of countries	7	5	7	5	7
*** p<0.01, ** p<0.05, * p<0.1					
t statistics in parentheses					

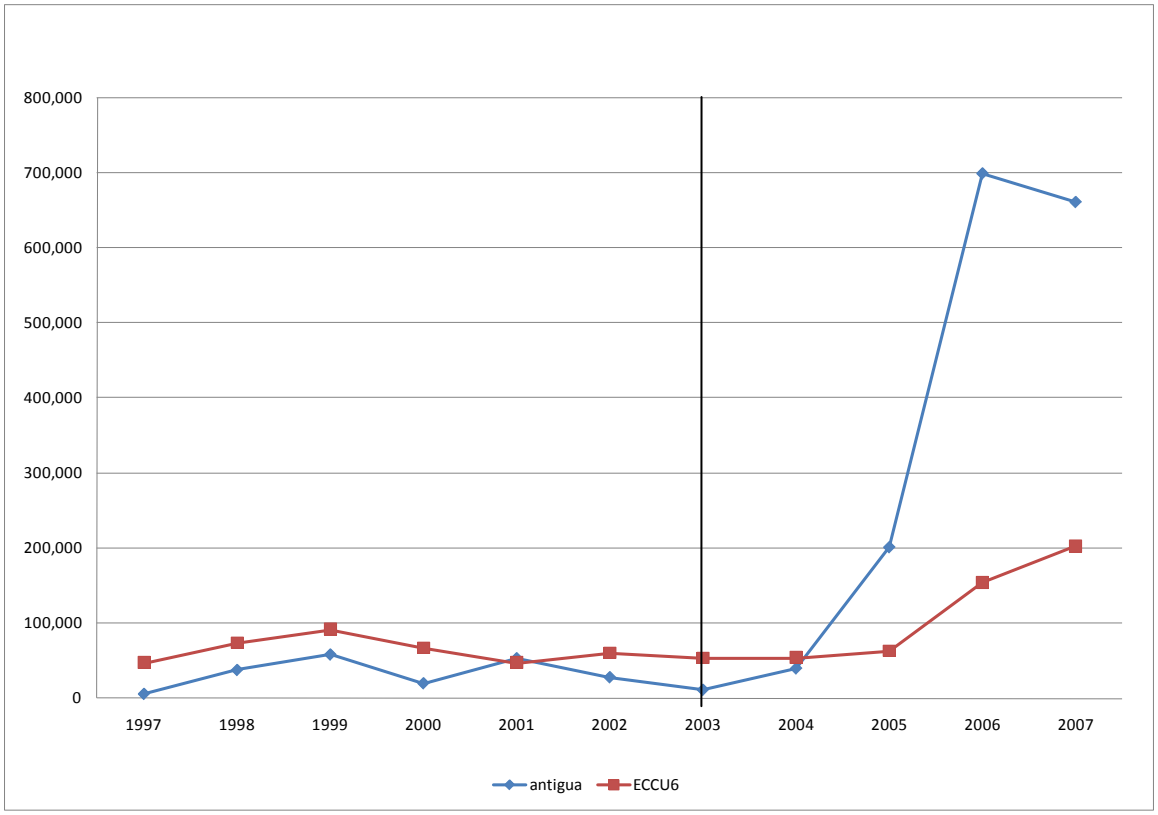
Table 6: regression results non tourism FDI, 1997-2007.

	Dependent variable: non Tourism FDI					
	(1)	(2)	(3)	(4)	(5)	(6)
	all countries				excl Grenada	excl Dominica and Anguilla
Antigua2003	-0.184	-0.104	-0.110	-0.060	-0.070	-0.083
	(-0.58)	(-0.33)	(-0.34)	(-0.19)	(-0.21)	(-0.23)
CricketWC2007		-0.480	-0.483	-0.566*		
		(-1.55)	(-1.55)	(-1.80)		
Ivan2004			-0.147	-0.069		
			(-0.28)	(-0.13)		
Grenada2006				0.777		
				(1.43)		
Constant	0.231	0.231	0.231	0.231	0.156	0.294
	(1.29)	(1.31)	(1.30)	(1.31)	(0.80)	(1.27)
Observations	77	77	77	77	66	55
Number of countries	7	7	7	7	6	5
R-squared	0.28	0.31	0.31	0.33	0.38	0.36

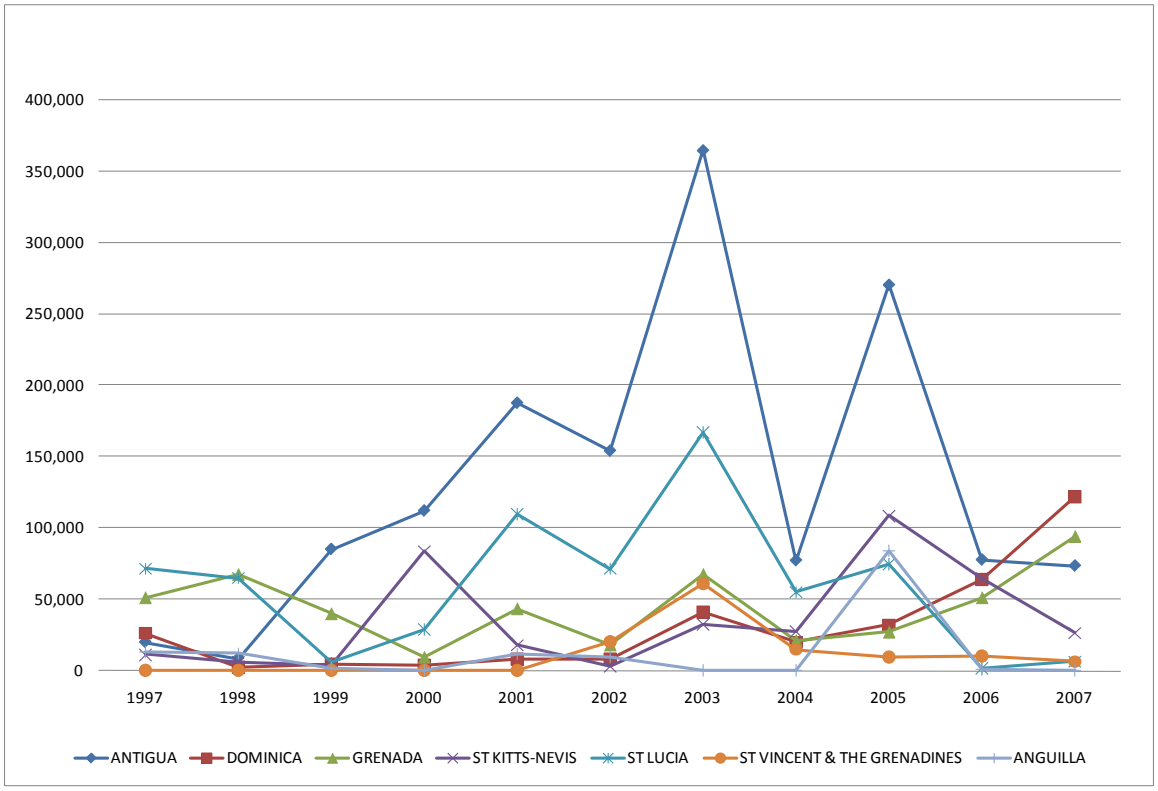
*** p<0.01, ** p<0.05, * p<0.1
t statistics in parentheses

Graph 1: Tourism FDI (Eastern Caribbean dollars).



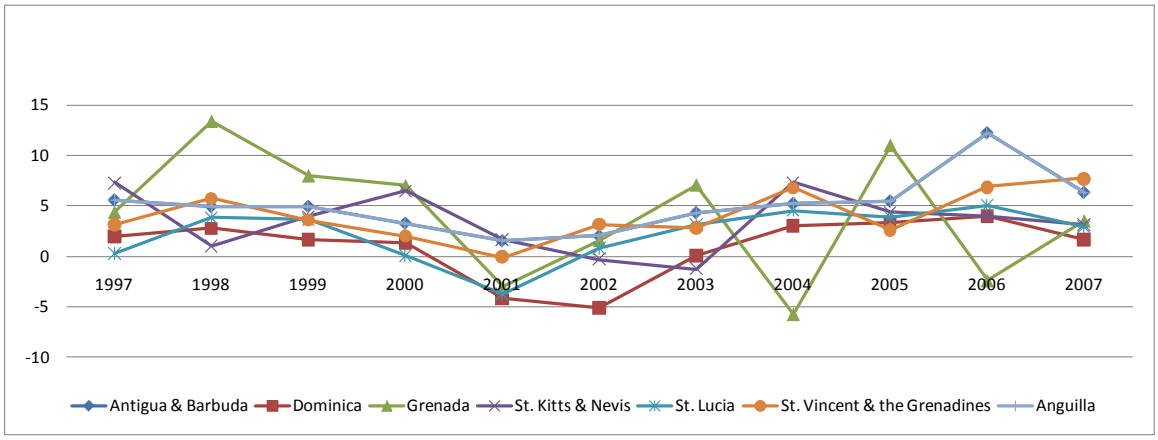


Graph 2: Non tourism FDI (Eastern Caribbean dollars).

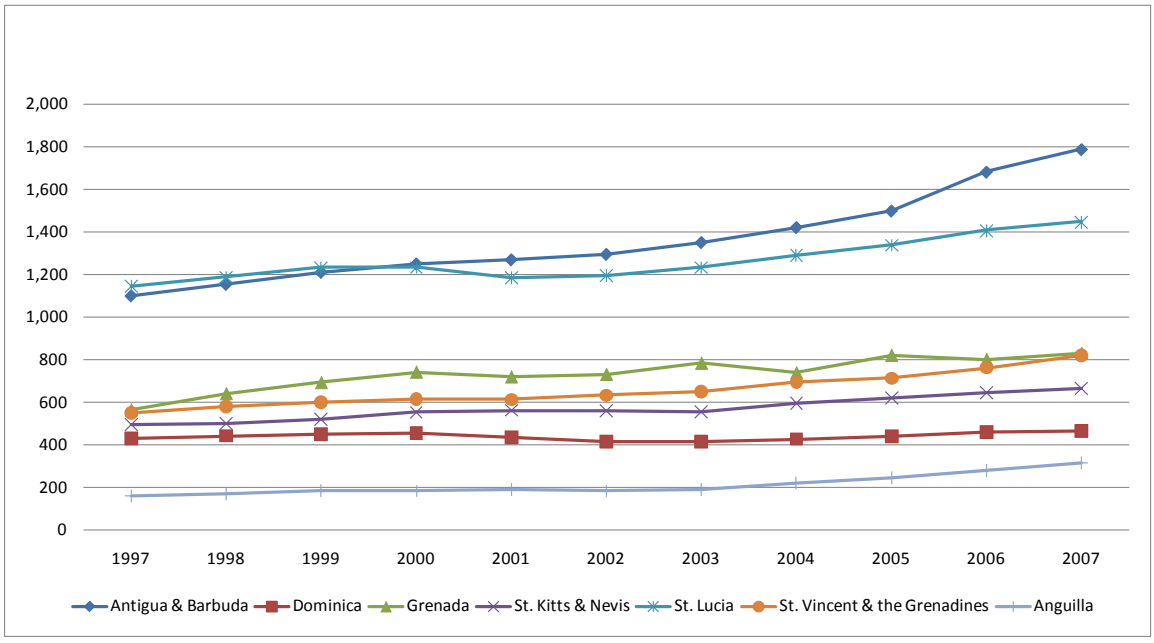


Appendix:

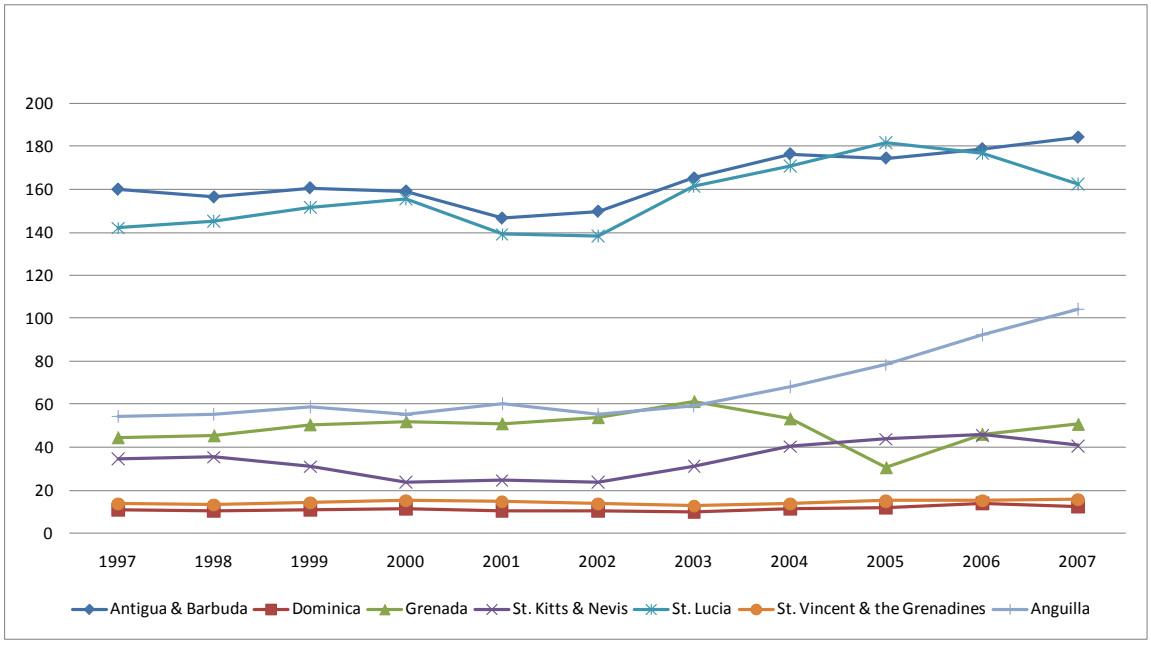
Graph A1: GDP Growth rate.



Graph A2: Total GDP (millions of Eastern Caribbean dollars).



Graph A3: Hotels and Restaurants (millions of Eastern Caribbean dollars).



Graph A4: Construction (millions of Eastern Caribbean dollars).