Article

Examining the "Natural Resource Curse" and the Impact of Various Forms of Capital in Small Tourism and Natural Resource Dependent Economies

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Abstract: The question of the relevance of human and natural capital, as well as the potential adverse effect of natural capital on economic growth, has gained increased attention in development economics. The aim of this paper is to theoretically and empirically assess the relevance of several forms of capital on economic growth in small economies that are dependent upon tourism or natural resources. The empirical framework is based on Impulse Response Functions obtained from Vector Autoregressive models in which we focus on the model where economic growth is the dependent variable for ten small economies that are dependent upon either tourism or natural resources. We find that there is evidence of the ''natural resource curse'', especially in the economies that have a strong dependence on resources that are easily substitutable and whose prices constantly fluctuate. We further find that in the majority of observed cases the type of capital these small economies are most dependent on for their economic growth causes negative impulses in the majority of the observed periods. The main policy recommendation should be to assure that even these small economies should strive towards further diversification and avoid dependence on only one segment of their economy.

Keywords: natural capital; human capital; economic growth; small economies; Vector Auto regression; natural resource curse

JEL Classifications: O47; Q32; E32; I25; O44

1. Introduction

There is a well-known differentiation between different forms of capital: natural, financial, foreign, real, human, and social (Gylfason, 2006 [1]). Goodwin [2], on the other hand differentiates between five kinds of capital: financial, natural, produced, human, and social. He states, "All are stocks that have the capacity to produce flows of economically desirable outputs. The maintenance of all five kinds of capital is essential for the sustainability of economic development [2] (p.1)." All these forms of capital represent determinants of economic growth. The difference is how these different kinds of capital affect economic growth and is this relationship statistically significant or not.

The main intention of this paper is to study the research hypotheses empirically, by comparing the role of both natural and human capital in the small economies that are dependent on natural resource exports or tourism (economies that primarily depend on foreign guests and consumption, i.e. receptive tourist countries), respectively. We absolutely recognize the differences between resource extraction and tourism, as two very different types of economic activities. However, some similarities occur, which have led us to believe that resource export dependent countries and countries dependent on tourism should be compared, regarding the causes of vulnerability of their economies and long-term growth perspectives. Natural resource extraction (in this context we

primarily refer ourselves to fuels and/or minerals and ores) and exports, if not accompanied by industrial production in the countries of origin, in most cases cause economic stagnation or even recession, rising social inequality, keep or increase widespread poverty, rise corruption, hinder democratic processes and "kill" political freedom and civil liberties. At least that is what various proponents of the "resource curse" thesis (Robinson, Torvik and Verdier, 2006 [3]; Rosser, 2006 [4]; Schubert, 2006 [5]; Humphreys, Sachs and Stiglitz, 2007 [6]; Brunnschweiler and Bulte, 2009 [7]; Hendrix and Noland, 2014 [8]) claim. There are only a couple of exceptions to that rule, hence actually verifying it. The best exception due to the cultural and historical patterns of social and economic development is most probably Norway. Exceptions due to the planned government policies of economic transformation include Qatar and Dubai, which in the recent two decades have been able to diversify their economies.

The effect of human capital on economic growth has already been considered in many studies. Indeed, since this issue has first caught the attention of researchers several significant improvements have been made. An issue that has caused a significant debate is the use of human capital proxies in order to assess their relevance for economic growth. Notably since the work of Barro [9], he has made it perfectly clear in his research that his variables are human capital proxies. These original considerations have meanwhile been reviewed and Judson [10] notes that the commonly used proxy variables are education expenditure, years spent in education or education enrolment. The relevance of the variable that Judson attempted to construct displays the sharp need to redefine the measurement of human capital [10].

This study approaches two highly relevant issues from a similar approach. Most notably, this study does not question the assertion that human capital proxy variables are imperfect and provide at times disputable results. All variables are to a different degree imperfect. An issue that should perhaps be pointed out is that the vast majority of variables that are used in econometric research are to at least some degree arbitrary. Many researchers would agree that GDP per capita is far from a perfect indicator of the quality of life. However, several have noted that GDP itself is far from a perfect measurement of economic growth, and yet today it is practically used as a synonym for it (Costanza et al., 2009 [11]). The use of various research methods and approaches should be considered beneficial to the overall growth of science rather than assuming a dogmatic approach.

The main goal of this study is to critically analyze the similarities and differences between the relevance of human capital and natural capital in small economies that are affected by the 'natural resource curse' in comparison to countries that are dependent upon tourism as a source of revenue. The main idea behind this approach is that these countries suffer from many similar issues. Due to their size and properties most of them are also highly dependent on one or two sources of revenue, which through a multiplicative effect then has a crucial effect on their economies. This can be highly detrimental to their economies, especially taking into the fact that factors such as oil prices and the arrival of tourists are factors that these small economies cannot hope to control or even prepare for.

2. Methodology

The smallness of the economy was taken as a prerequisite for including a particular economy into research mainly because we wanted to test if the smallness of the economy itself is connected with a high dependence on natural resources rents overlaps (in most cases) with significant economic underdevelopment and inability to develop other sectors of the economy. Nevertheless, smallness of the economy in most of the economies that hold these characteristics is not the cause, but the consequence of these characteristics, due to the low or extremely low level of GDP per capita. Therefore, smallness of the economy is not studied *per se*. It is primarily used as a filter that determines (in accordance with the afore-mentioned indicators) which economies are to be studied. The characteristics of studied resource dependent economies are in accordance with the resource curse thesis [6].

The current methodological constraints provide several limitations towards the measurement of human and natural capital. As such it is difficult to provide results that will provide absolute certainty, but a dogmatic approach is something researchers should strive to avoid. Many of the

measurements are imperfect and this paper likewise suffers from similar limitations. Generally, when describing economic growth it is difficult not to mention the Cobb-Douglas function [12], as follows:

$$Y = AL^{\beta}K^{\alpha}, \quad (1)$$

where α and β are output elasticities, Y is the measurement of economic growth, A is the total factor productivity, while L and K are respectively the labor and capital inputs. This function was criticized primarily for not taking into account different forms of capital, which is the key reason why today a majority of researchers favor the so called Solow-Swan model and others. This model is partially based on the work of Solow [13], while there are constant discussions whether Solow or Swan should be credited for the model we have today. This includes papers such as Diamond and Spencer (2008, [14]) that discuss the relevance of both the work of Solow and Swan to the model. Solow [13] begins with a function that does not differ significantly from the Cobb-Douglas function, and goes as follows:

$$Q = A(t)f(K, L), \quad (2)$$

where he takes into account the factors that affect the output (Q), based on the change of physical units of input of labor and physical capital, as well as A which accounts for the cumulated effects of change over time. The function of this paper is not to determine which researcher contributed more to the development of the function. Therefore, this paper refers to it as the Solow-Swan model. Perhaps the most significant change over time in regards to human capital was added in the research of Mankiw, Romer and Weil (1992, [15] (p.416)), as follows:

$$Y(t) = K(t)^{\alpha}H(t)^{\beta}(A(t)L(t))^{1-\alpha-\beta}, \quad (3)$$

where the notable change in regards to the Solow-Swan model is including the relevance of human capital on economic growth. Rather than taking any of these functions as dogmatic, this paper analyses the relevance of several variables that may impact economic growth, measured by the change of real GDP. An empiric evaluation of which factors impact economic growth will provide us with a more exact specification of the similarities or differences between the observed economies. Thus this paper assumes that economic growth is significantly influenced by a series of factors that include several forms of capital, which can simply be described as:

$$Y(t) = f(K, L; t), \quad (4)$$

thus assuming that in the time period t economic growth is influenced by the output of labor and capital. At this point the discussion shifts to which best proxy variables can be used to describe the change of economic growth and the relevant variables. In the case of the economies that this paper studies, this paper distinguishes several forms of capital whose measurement will be empirically assessed. Therefore the model takes the form:

$$Y(t) = f(HC, NC, PC, L; t), \quad (5)$$

where we account for the existence of human, natural and physical capital that have different effects of economic growth in the observed time period t. This paper primarily analyses the relevance of the variables described in Table 1 towards the dependent variable, which is GDP measured in constant 2010$.

Table 1. Model specification

Variable	Abbreviation used	Source	Function
Gross Domestic Product	GDP	World Bank (2016)	Dependent variable
Gross Fixed Capital Formation	GFCF	World Bank (2016)	Independent variable
Total Natural Resource Rent	NC	World Bank (2016)	
Human capital stock	HC	Barro-Lee database (2013)	
Gross Domestic Product per capita	GDPpc	World Bank (2016)	

The database originally created by Barro and Lee (2013, [16]) is perhaps the most recognized database that has measurements for long-term human capital stock. As the data is for 5-year averages we use linear extrapolation in order to gain annual values. Although this approach has shortcomings in assuming that between two 5-year points the data moves in a precise linear trend which is not correct, we find this approach preferable to using different human capital proxy variables such as school enrolment or education expenditure. This paper analyses the time period of 1970 – 2014, for which data was available, for small tourism and natural resources dependent economies. The remaining data was extracted from the World Bank database [17]. Perhaps it should be noted that for GFCF the data was not always available in 2010 real dollars, in which case the authors manually corrected the nominal data for inflation using the GDP deflator, also obtained from the World Bank database [17]. The data for total natural resource rents was presented in the form of percentage of GDP, but in the empirical part of the paper we calculate the value of the natural capital stock by applying the following:

$$NC = log(\frac{TNRR*GDP}{100}); \quad (6)$$

where we measure the natural logarithm of the actual natural capital stock. All of the variables are converted into the form of their natural logarithm, meaning that we aim to obtain the elasticities of their relationships. Before implementing econometric models we use the test originally developed by and Dickey and Fuller (1979, [18]), with the lag length specification based on the information criterion introduced by Akaike (1974, [19]). This test has the null hypothesis of non-stationarity, meaning that the means and variances between the data are not equal. Stationarity is necessary in order to avoid errors of possible spurious, statistically insignificant results. Rejection of the null hypothesis of non-stationarity at the 5% significance level is necessary prior to conducting further econometric models or tests. As can be seen in Appendix A where we provide the full results of the unit root and other specification-related tests, for most of the countries the variables are integrated in different orders and several of them, mostly HC, are I(2).

This limits possible empirical approaches as the variables are not cointegrated, the approach developed by Peseran and Shin [20] can only be implemented if the variables are stationary or stationary in their first difference. Therefore, it seems most logical to capture the relationship between the variables using a Vector Autoregressive (VAR) model approach. This paper analyses each country individually rather than using a panel setting. The key reason is that the small economies that are observed by the paper have highly specific properties that might be more difficult to observe in a panel setting. Thus we focus on the two out of four possible equations that such an approach provides us with:

$$GDP_t = \alpha_0 + \alpha_1 GDP_{t-1} + \cdots + \alpha_{1,2} GDP_{t-n} + \alpha_2 GFCF_{t-1} + \cdots + \alpha_{2,1} GFCF_{t-n} + \alpha_3 HC_{t-1} + \cdots + \alpha_{3,1} HC_{t-n} + \alpha_4 NC_{t-1} + \alpha_{4,1} NC_{t-n} + \varepsilon_{t,1}, \quad (7.1.)$$

$$HC_t = \beta_0 + \beta_1 HC_{t-1} + \cdots + \beta_{1,2} HC_{t-n} + \beta_2 GDP_{t-1} + \cdots + GDP_{2,1} Y_{t-n} + \beta_3 GFCF_{t-1} + \cdots + \beta_{3,1} GFCF_{t-n} + \beta_4 NC_{t-1} + \cdots + \beta_4 NC_{t-n}\ \varepsilon_{t,2}; \quad (7.2.)$$

where the variables are abbreviated as specified in Table 1, α_0 and β_0 are the constants, $\alpha_{1..4}$ and $\beta_{1..4}$ are the coefficients, $\varepsilon_{t,1,2}$ are the error terms in the maximum lag length n, determined based on the Akaike information criterion, in the time period t. The reason why we focus on these two specific equations is the research interest of this paper, which is determining the relationship between various forms of capital on economic growth, but we also include the question of whether natural capital has a significant effect on human capital. In order to examine this relationship we conduct Impulse Response Functions (IRF) that depend on the earlier work of Sims (1980, [21]).

Regarding the specification tests, the autocorrelation test is based on the research by Breusch (1978, [22]) and Godfrey (1978, [23]), the ARCH effect test is based on the work of Engle (1982, [24]) and the test for stability of the VAR inverse roots, which are essential for the stability of the model, based on Lütkepohl (1991 [25]).

The small economies for which data was available were initially selected as either resource dependent or tourism dependent, based on World Bank indicators [17] and data from the World Travel & Tourism Council [26]. The research was focused on small economies of the world (classified by the size of their GDP) that are either highly dependent on natural resources rents as percentage of

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GDP or highly dependent on tourism as a sector of their economies. The negativities of small economies, besides other features, usually include vulnerability to external shocks (albeit resilience as well, especially in some cases), less opportunities to diversify the economy, smaller workforce base, small resource base (in most cases). A short discussion regarding such a specification, as well as some initial observations, is available in Appendix B. The average values for all of the countries observed may be found in Table 2.

Table 2. Average values of variables

Country	GDP	GFCF	TNRR	HC	GDPpc
Gambia	536,971,279.76	132,037,190.21	3.26	1,249.89	518.45
Trinidad and Tobago	12,012,729,470.09	4,124,355,950.29	29.69	2,463.22	9,847.27
Lesotho	1,206,862,818.90	369,438,579.20	6.23	1,719.04	701.54
Belize	711,605,918.56	198,213,544.06	2.12	2,150.78	3,027.54
Guyana	1,647,108,974.58	10,347,248,118.94	15.62	2,150.98	2,209.12
Jamaica	10,996,282,998.37	63,294,708,299.15	5.36	2,262.16	4,582.56
Fiji	2,293,187,461.92	607,605,293.41	1.57	2,430.64	3,075.16
Liberia	1,640,762,520.67	215,123,317.64	34.41	1,362.07	780.92
Malawi	378,197,664.6	3,011,299,903.8	7.96	1410.4	384.81
Barbados	3,809,503,148.58	185,310,222.4	0.546	2415.8	14216.92

Source: Authors' calculations

An important factor to emphasize is that such a categorization, into resource and tourism dependent countries, does not influence the empirical segment of the paper due to the fact that each country is individually analyzed. The calculations are conducted in the Gnu Regression, Econometrics and Time-series Library (GRETL).

3. Results

As specified in the methodological section, the first step is conducting unit root tests, with the conclusions of the test presented in Table 3, while the full results are available in Appendix A.

Table 3. ADF test conclusions

Country	GDP	GFCF	HC	NC	GDPpc
Gambia	I(1)	I(1)	I(2)	I(1)	I(1)
Trinidad and Tobago	I(1)	I(1)	I(2)	I(0)	I(2)
Lesotho	I(1)	I(1)	I(2)	I(1)	I(1)
Belize	I(1)	I(1)	I(2)	I(1)	I(1)
Guyana	I(1)	I(1)	I(2)	I(1)	I(1)
Jamaica	I(1)	I(0)	I(2)	I(1)	I(1)
Fiji	I(1)	I(1)	I(2)	I(1)	I(1)
Liberia	I(1)	I(1)	I(2)	I(1)	I(1)
Malawi	I(1)	I(1)	I(2)	I(1)	I(1)
Barbados	I(1)	I(1)	I(I)	I(1)	I(1)

Source: Authors' Calculation and GRETLE output

3.1. VAR IRF Results

Based upon the results of the unit root test we may proceed to conduct further statistical analysis *via* the VAR models. The specification tests have determined that the models are not under the influence of the ARCH effect at the selected lag length; furthermore, they are not influenced by autocorrelation and have structurally stable parameters based upon the results of the results of the stability of the VAR inverse roots. All of these results are available in Appendix A, as well as the Cholesky ordering of the variables. Having satisfied all of these preconditions, it is possible to estimate and analyze the results that are provided by the IRFs.

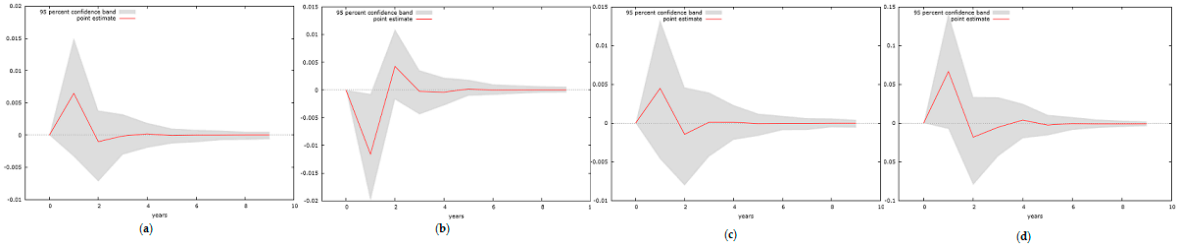

Figure 1. IRF for Gambia; (**a**) is the response of GDP to an impulse of GFCF, (**b**) is the response of GDP to an impulse of HC, (**c**) is the response of GDP to an impulse of NC and (**d**) is a response of HC to an impulse of NC.

The results for Gambia suggest that in none of the observed variables is there a significant long-run relationship. The model was estimated at the lag length 1, due to misspecification errors that occurred at two lags proposed by the Akaike information criterion. The initial response to GFCF is positive but becomes statistically insignificant after two or three periods. The initial response of GDP to HC is negative, but oscillates after two periods when it becomes statistically insignificant. The result of an impact of NC is comparable with the result of the GFCF impulse response where there is a short-term positive response that seems to be neutral in the long-term. NC seems to cause a significant positive response to HC that becomes neutral after the first few periods.

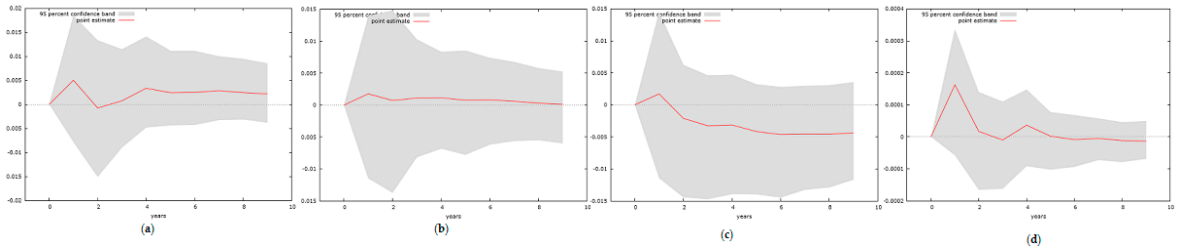

Figure 2. IRF for Trinidad and Tobago; (**a**) is the response of GDP to an impulse of GFCF, (**b**) is the response of GDP to an impulse of HC, (**c**) is the response of GDP to an impulse of NC and (**d**) is a response of HC to an impulse of NC.

The model was estimated at the lag length of two, as suggested by the Akaike information criterion. The results for Trinidad and Tobago differ significantly from the results for Gambia. Most notably, the shock of GFCF seems to indicate a long-term positive increase of GDP. The shock of HC in GDP produces a slightly positive result that after eight periods becomes neutral, while there is evidence that NC after a very slight positive shock has negative responses after two periods and the responses have a persistently negative trend. The shock of NC in HC causes a short-term positive impact that fluctuates and becomes statistically insignificant after two or three periods.

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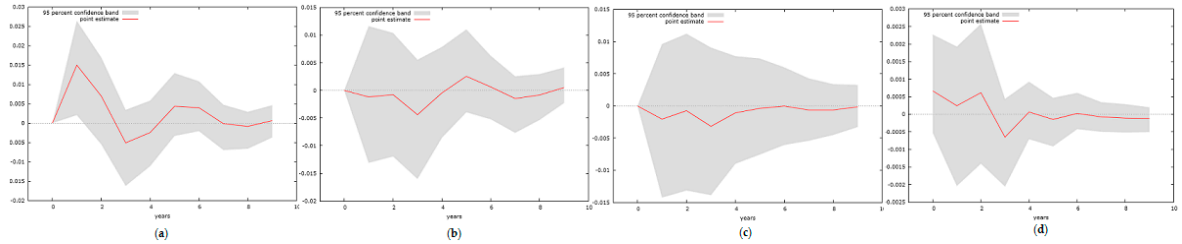

Figure 3. IRF for Lesotho; (**a**) is the response of GDP to an impulse of GFCF, (**b**) is the response of GDP to an impulse of HC, (**c**) is the response of GDP to an impulse of NC and (**d**) is a response of HC to an impulse of NC.

Lesotho, which is to a degree dependent upon natural resources, displays different tendencies. The model was specified at the lag length two. It clearly has a positive short-term impact of GFCF on GDP that starts to fluctuate after four periods. The results of both HC and NC impulses on economic growth are initially negative, although very slightly so. The response of economic growth to NC has a persistently negative trend until reaching *limes* 0, while the response to HC begins to oscillate after 4 periods. The initial impulse is not as negative as in the case of Trinidad and Tobago.

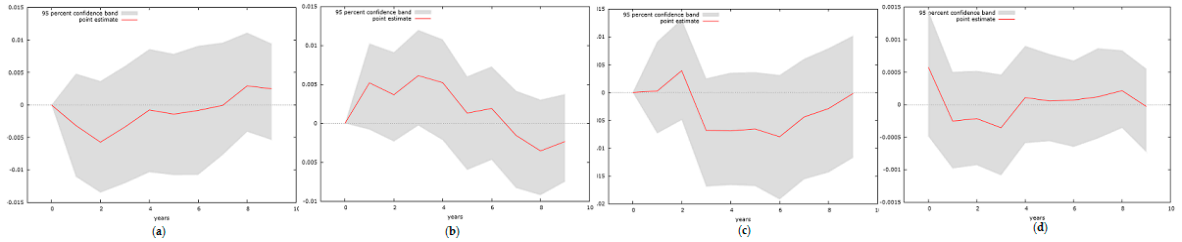

Figure 4. IRF for Belize; (**a**) is the response of GDP to an impulse of GFCF, (**b**) is the response of GDP to an impulse of HC, (**c**) is the response of GDP to an impulse of NC and (**d**) is a response of HC to an impulse of NC.

The VAR model for Belize includes three lags of the variables, based on the Akaike information criterion. The response of GDP to GFCF seems to be negative in the short run, although the trend ends after eight periods when it becomes positive. HC seems to have a statistically significant positive response that persists until the seventh period. Despite being a country that is not dependent upon natural capital, there is evidence that the response is significantly negative for most of the periods that are observed. The impact of NC on HC fluctuates after two periods until the impact becomes *limes* 0.

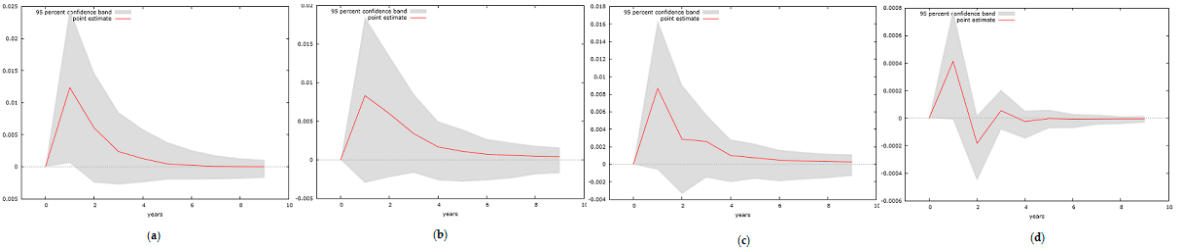

Figure 5. IRF for Guyana; (**a**) is the response of GDP to an impulse of GFCF, (**b**) is the response of GDP to an impulse of HC, (**c**) is the response of GDP to an impulse of NC and (**d**) is a response of HC to an impulse of NC.

The results for Guyana differ significantly to all of the other natural resource dependent countries. This issue will be addressed in far greater detail in the discussion. Regarding the empirical results, at this point it is sufficient to state that at the lag length of one, the effect of GFCF on GDP is strongly positive and remains positive until eventually reaching a slightly positive value that is close to 0. The results for HC and NC are similar, except for the fact that an impulse of NC is almost twice as strong in the first impulse. Both remain positive until eventually remaining only marginally positive after seven periods. It should be noted that Guyana is the only case amongst the resource dependent countries where none of the impulses of NC to economic growth in the observed periods

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was at no point negative. The initial impulse of HC to NC is positive, although the fluctuations start after two periods and reach *limes* 0 after four impulses.

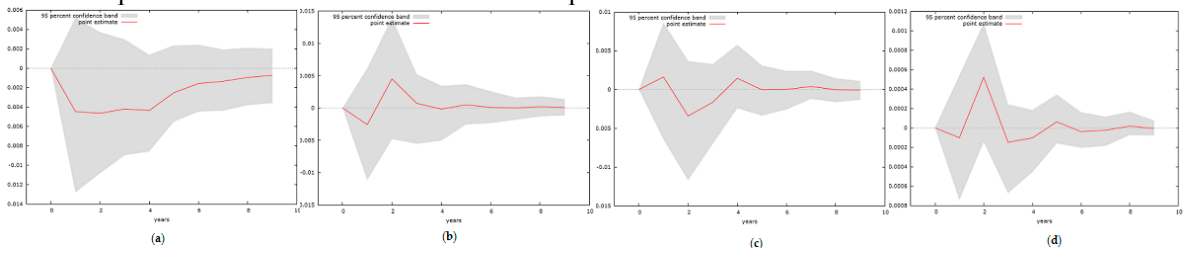

Figure 6. IRF for Jamaica; (**a**) is the response of GDP to an impulse of GFCF, (**b**) is the response of GDP to an impulse of HC, (**c**) is the response of GDP to an impulse of NC and (**d**) is a response of HC to an impulse of NC.

Jamaica is also estimated at the lag length of two, where all of the diagnostic tests confirm the stability of the observed models. Interestingly, as was the case in the Belize IRF's, GFCF seems to cause a significant negative response in GDP that persists until nine periods. This is interesting as both of these economies are dependent upon tourism revenue. The other factors are not comparable with Belize, as the responses to HC and NC reach *limes* 0 at around the fifth period, while the response of HC to NC is in constant fluctuation after a mild negative response, until reaching *limes* 0 at eight periods.

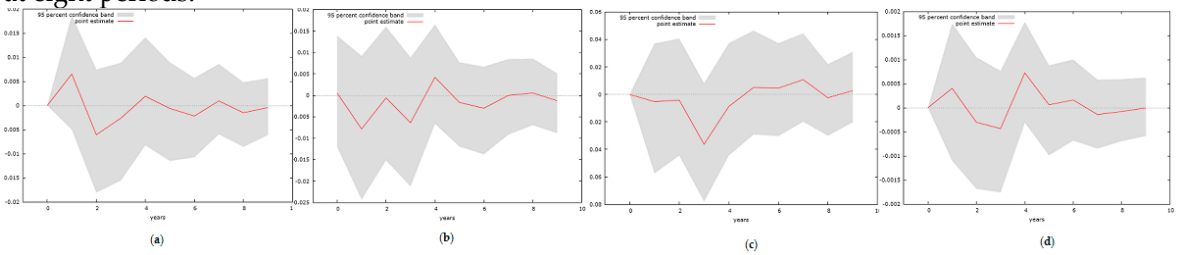

Figure 7. IRF for Fiji; (**a**) is the response of GDP to an impulse of GFCF, (**b**) is the response of GDP to an impulse of HC, (**c**) is the response of GDP to an impulse of NC and (**d**) is a response of HC to an impulse of NC.

Fiji, despite the fact that it has increased dependence on tourism revenue, does not exhibit exactly similar traits as Belize and Jamaica. For both of these countries it was, perhaps, most notable that GFCF displayed a statistically significant and negative impulse towards GDP. Here the response after the first period is positive, while it fluctuates after two periods, despite mostly remaining negative. The impulses of HC and NC cause negative responses until the fourth period. This means that of the three tourism dependent economies observed so far, all have different responses in regards to HC and NC. The response of HC to NC is positive, but starts fluctuating after two periods until reaching *limes* 0 around nine periods.

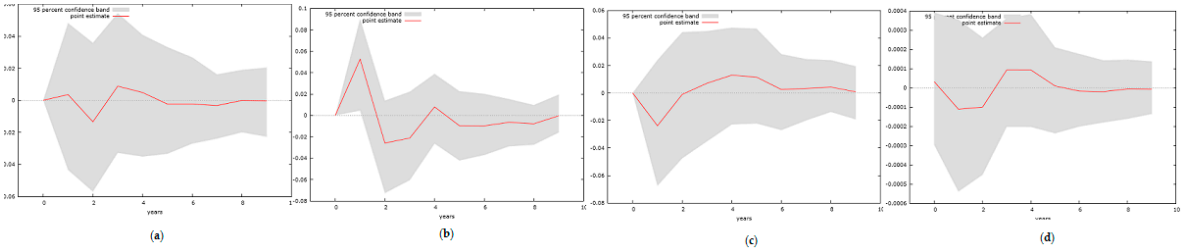

Figure 8. IRF for Liberia; (**a**) is the response of GDP to an impulse of GFCF, (**b**) is the response of GDP to an impulse of HC, (**c**) is the response of GDP to an impulse of NC and (**d**) is a response of HC to an impulse of NC.

The specification of the models with the selected lag length of two did not provide significant differences in comparison with the previous models. The response of GFCF seems to become statistically insignificant after two periods, where it soon becomes irrelevant. The initial high response of GDP to HC starts to fluctuate after two periods, while the initial response of economic growth to NC is negative for the first three periods before it becomes statistically insignificant. The response of HC to NC is not statistically significant.

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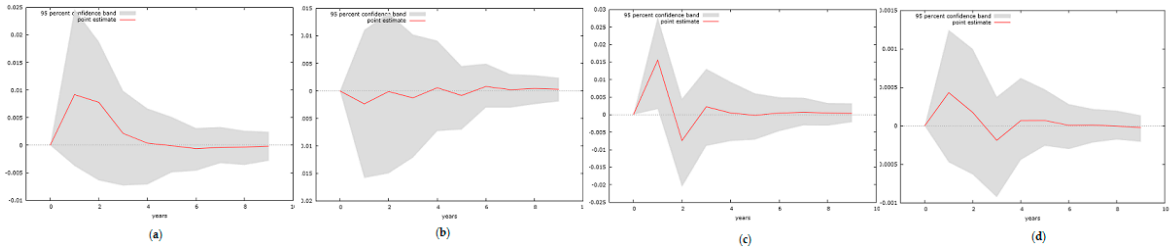

Figure 9. IRF for Malawi; (**a**) is the response of GDP to an impulse of GFCF, (**b**) is the response of GDP to an impulse of HC, (**c**) is the response of GDP to an impulse of NC and (**d**) is a response of HC to an impulse of NC.

The economy of Malawi has some different traits in comparison to other resource dependent economies. Primarily, Malawi is dependent upon agriculture as a source of economic growth which is far less prone to external shocks. Perhaps due to that fact, with a lag length of two, an impulse of GFCF has a positive impact on GDP until the impulse reaches *limes* 0 after five periods. The impulse of HC on economic growth provides a slightly negative response, although the value is close to being statistically insignificant. The impact of NC on economic growth is positive in the short run, but starts oscillating after 4 periods and definitely reaches *limes* 0 after six periods. The initial response of HC to NC is positive, but the response in negative after three periods, soon after which it reaches the value of 0.

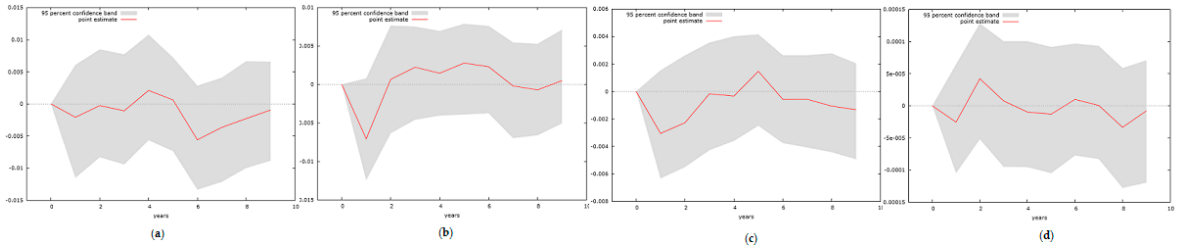

Figure 10. IRF for Barbados; (**a**) is the response of GDP to an impulse of GFCF, (**b**) is the response of GDP to an impulse of HC, (**c**) is the response of GDP to an impulse of NC and (**d**) is a response of HC to an impulse of NC.

The results for Barbados have some similarities with the other small economies dependent upon tourism. Primarily, this refers to the negative response of GDP to GFCF that persists through most of the 10 periods. The initial responses of GDP to HC and NC are both initially negative. In the case of the responses of HC, the oscillation without a determinate pattern starts at three periods, while in the case of the responses of NC it begins at six periods. The initial response of HC to NC is negative, but statistically insignificant as it constantly fluctuates.

4. Discussion

The discussion is divided into the following three sections. The first deals with the interpretation of the results gained from the VAR model regarding the natural resource dependent economies. The second deals with the discussion regarding the tourism dependent economies, while the third section in detail discusses theoretical aspects related to both the concept of human capital and the concept of natural capital.

4.1. Discussion of observed natural resource dependent economies

The first aspect of the discussion focuses on the countries that might be under influence of the ''natural resource'' curse. The first thing that should be noted is that in countries is that the negative influence of natural capital is more pronounced in countries that are 1) heavily dependent upon oil and 2) do not have diverse exports in either partners they trade with nor the products they export. This is mostly visible in the case of Trinidad and Tobago, where there is a clear case of a long-term persistent negative impulse caused by NC. This can be explained through two reasons. Primarily, the economy of Trinidad and Tobago is for a roughly 65 percent dependent upon the export of

various forms of oil [17], [27]. This would confirm the 'oil curse', as oil is a commodity whose value constantly fluctuates on the international market and the economy of the countries which produce it can do very little to prepare for such fluctuations. While larger producers have a say in OPEC, the previously stated is especially true for small economies that do not have significant political influence.

The second persistent negative trend is for the IRF for Lesotho, although the effect is less pronounced than in Trinidad and Tobago. The production of Lesotho is perhaps more diversified than in the case of Trinidad and Tobago, but the problem with Lesotho is that it mainly produces commodities that are available from other exporters, such as wool and mohair, while perhaps the resource it is best known for are its diamond deposits and limited amounts of other minerals [28]. None of these commodities are essential and most of them can be substituted with products from other exporters and any negative spike in the global market decreases demand for most of the products Lesotho exports, making it highly prone to shocks in the international financial market.

There is the evidence of an initial negative response for Liberia, though there seems to be no long-term persisting negative trend that exists in Trinidad and Tobago and Lesotho. Unlike Lesotho and Trinidad and Tobago, Liberia is dependent on exports of goods such as iron ore, rubber, wood and cocoa beans [29], [30]. Based on this information, we conclude that its exports are far more diversified than that of Trinidad and Tobago, and most of the resources it exports are necessary for the functioning of modern industrial countries, unlike the products that Lesotho exports. It should also be noted that the prices of iron ore do not fluctuate negatively as the price of crude oil, as from 1986 to 2008 the price of iron ore has remained mostly stable with only two significant positive fluctuations in 2004 and 2008 [31]. As was previously emphasized, these economies do not have a strong position in determining the price and negotiating, which overall conforms to the conclusions of Braveboy-Wagner [32].

The last two natural resource dependent economies that are considered are Malawi and Guyana. The short-term positive impact and long-term neutral impact in Malawi is probably because Malawi, as an economy, is mostly dependent upon agriculture. Due to the fact that the majority of its population is also employed in that sector and it is far less dependent upon exports, it means that it is far less prone to shocks in the international economy. In addition, its average TNRR value is roughly eight percent, meaning that overall its economy is not completely dependent upon natural resources. Guyana is a case where if we accept the ''necessity of a diverse export'' hypothesis we should expect a highly negative effect of NC on economic growth. Despite the fact that Guyana is dependent upon the export of one resource almost as Trinidad and Tobago is on petroleum, the short-term effect of NC is highly positive, with a persistent positive trend.

This is because roughly 58 percent of Guyana's export is dependent upon gold [33]. Gold has for a long time been a very stable resource whose value has fluctuated very little in the past 30 years. There have even been claims that gold is a safe-haven used in times of crisis, a claim investigated by Baur and McDermott [34]. Meaning that in the times of crisis not only does the price of gold not decrease, the price of gold actually increases, as it is perceived as a commodity whose price is not prone to fluctuation. Even close to half a century after Nixon abolished the gold standard, gold is still perceived as a stable commodity. Perhaps an interesting case can be made that the 'natural resource curse' is highly dependent upon which resource the economy is dependent upon, at least considering empirical evidence from five small economies observed in this paper. The key questions which determine the properties of these countries seem to be: 1) how stable are the prices of the resources these countries are dependent on; and 2) how hard is it to substitute these products.

The general conclusions regarding small resource dependent economies are: 1) that the negative impact of NC on economic growth is more evident in countries that are dependent upon the export of commodities whose prices are significantly influenced by shocks in the international market; 2) generally, more diverse economies tend to have a smaller negative impact of NC on economic growth, as well as economies that export resources whose prices are less prone to shocks in the international market; 3) we find empirical evidence of the 'oil curse' in the case of Trinidad and Tobago; and finally, 4) that the negative effect is more pronounced in countries with a larger

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average TNRR, unless the commodity they are dependent on has a highly stable price and is difficult to substitute.

4.2. Discussion of observed tourism dependent economies

The difficulty with measuring the impact of natural capital in tourism dependent economies is that it does very little to measure the actual strain that increased tourism activity may cause to a particular environment. This is the difficulty of the majority of existing variables that are used to measure natural capital, due to the fact that in the majority of these countries their natural capital is the factor that is attracting tourists. In contradiction to this claim, the TNRR for the majority of these countries is very low, with the exception of Jamaica where the value is on average five percent of GDP due to the fact that Jamaica has a certain amount of natural resources, mainly bauxite [35]. The most that can be done is interpret these results taking into account the limitations of the variables.

Interestingly, the main measurable indicator of those economies was GFCF and in the economies that are most dependent upon tourism and other external activities it would appear that the majority of the impulses in the observed ten periods were negative. The exception was Gambia, where the first impulse of GFCF was positive, while the long-term effects appear to be neutral. This is perhaps because Gambia is not completely dependent upon tourism, as it only depends upon tourism for roughly 20 percent of its GDP [26]. Even more importantly, of the five tourism dependent economies we observed, Gambia is by far the most dependent on foreign aid and has the lowest living standard, as well as being highly dependent on foreign aid [36]. Reports and other research suggests that tourism helps Gambia combat its high level of poverty (Mitchell and Fall, 2007 [37]. As such, in the case of a country where the GDP per capita was $528 [17], the scale and continuation of foreign aid is not so affected by shocks in the international market.

The case is different when examining Belize, Barbados, and Jamaica, where most of the impulses of GFCF are negative. Carneiro [38] found that the economy of Belize is highly prone to external threats and faced significant decline in the aftermath of the recent crisis, as well as in the case of the recession in the United States in the early 1990ies. More et al. [39] have also emphasized the fact that the economy of Barbados is highly dependent upon energy imports, especially oil, making them additionally prone to shocks in the international market.

Narayan [40] found that an increase in tourist revenue in Fiji of 10 percent causes a roughly 0.5 percent increase in real GDP. Fiji has perhaps an economy that is more diverse and equally under strain from internal shocks (coups and episodes of political violence), as well as external shocks, making it a highly specific example. Taking the results for Fiji with caution, as it is equally as dependent on tourism as Belize and Barbados, and even more so than Jamaica [26], we still find that there is empirical evidence of GFCF causing negative impulses in GDP in the majority of tourism dependent economies. This is highly interesting taking into account the fact that in the small economies we have observed we find that the most significant form of capital (in regards to economic growth) in the countries we have observed, produces negative impulses in the economic growth of these economies.

The impact of HC on economic growth produces mostly negative or neutral impulses in all of the ten observed economies, with the clear exception of Guyana. Perhaps more significantly, it is clear that in the least developed economies of those observed – Gambia, Lesotho, and Malawi, only in the case of Malawi do we find an initially positive impulse caused by human capital. This conforms to the general hypothesis of several researchers that human capital has a more significant effect in more developed economies (Neagu, 2012 [41]; Akpolat, 2014 [42]). In all of the observed economies we have failed to establish that NC has a long-term significant impact on HC. In most cases, we have observed that the initial response is positive, but the constant fluctuation that usually occurs after two or three periods means that we fail to establish a statistically constant and significant long-term relationship. Further research is necessary and we would advise most of it to be directed towards establishing variables that would more precisely measure HC and NC.

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4.3. Theoretical discussion regarding human and natural capital

As has been emphasized several times throughout this paper, one of the main difficulties with understanding the relevance of human and natural capital to economic growth is determining which variables should be used to measure them. All of the existing variables are highly dependent upon a certain concept of viewing these two respected types of capital. Through this theoretical discussion, we will attempt to review these views and emphasizes several key points.

Voora and Venema [43] have produced a concept paper about natural capital approach (NCA). They emphasize the recognition of natural capital by neoclassical economists [43]. Georgescu-Roegen highlighted the need for economists to understand the interrelated aspects between resource constraints, social stability and organization, and economic activity [44]. Natural capital affects economic growth directly as well as indirectly by crowding out other types of capital through the five channels of transmission, shows Gylfason [1]. The long-term stagnation of growth or negative growth, as well as the fluctuations of growth, experienced by resource dependent countries, can be pinned to this fact, and fluctuations of prices of commodities on the world market, respectively [1].

Gylfason [1] has shown, on the sample of 105 countries in the sample, the negative and highly significant relationship between economic growth and natural resource intensity (the latter is measured by the share of the primary sector in total employment). Society faces a new allocation challenge: how much natural capital should be converted to economic production, and how much should be conserved for the provision of ecosystem services? Both uses of natural capital are essential and have no substitutes (Farley, 2012 [45]).

GDP and economic growth is improved by liquidating natural capital (Naidoo, 2004 [46]). But the real question is – should the natural capital be transformed into some other form of capital before leaving the country, in order to maintain a higher and long-term GDP growth. The proponents of the resource curse thesis mentioned before have no doubts about it. For a country that has natural capital, it is better to transform it into some other form of capital before exporting it. In resource extraction dependent countries, natural capital is usually exported without its transformation, and in most cases, resource curse is a consequence. In tourism dependent countries, natural capital is used as a means to attract tourists (mostly foreign). In that way, services are exported and natural capital does not leave a country, hence it is of a different kind (landscapes, natural environments etc.).

The Economic Growth and NC Approaches measure human well-being very differently. The Economic Growth Approach gauges productivity based on human and manufactured capital [43]. Ecologist Robert Costanza teamed up with economist Herman Daly and established the new discipline of Ecological Economics by creating the Ecological Economics journal and the International Society for Ecological Economics in the late eighties [47]. Laguardia Martinez [48] suggests the following economic negative characteristics (disadvantages) of small economies: limited domestic opportunities leading to openness and susceptibility to adverse developments elsewhere; a narrow resource base leading to specialization in a few products with associated export concentration and dependence on a few markets; shortage of certain skills and high per capita costs in providing government services; greater vulnerability to natural disasters; and greater reliance on overseas aid and various preferential agreements.

The small size of the market (in terms of land area and population) may lead to less diversification of raw materials and resources, which restricts domestic production (Castello and Ozawa, 1999 [49]). Smaller island states tend to be particularly prone to exogenous shocks such as natural disasters, international political instability and fluctuations in prices of raw materials. Despite this, the idea of vulnerability should be considered in the context of the degree to which economies manifest resilience in tackling shocks (Camilleri and Falzon, 2013 [50]). This is also evident in our research, as the more diverse economies seem to have a lesser negative impulse from their most dependent form of capital.

Human capital—the learning, abilities, skills, and knowledge of an individual—can be used in the labor market as a form of currency (or capital) in exchange for wages or earnings. Human capital is often considered a key predictor of a person's employment and wages. Human capital theory [51] suggests that investments in human capital can be through formal schooling or on-the-job training, both of which raise workers' productivity and therefore increase their wages or earnings. Globalization and technological changes have made human capital development increasingly important for a nation's economic progress [52]).

Due to a lack of estimates for this variable in less developed countries, it has not been possible to assess the importance of this determinant for their growth and development (Moreira, Vieira, and Teixeira, 2014 [53]). Past and present literature has suggested that human capital is a key socio-economic development tool (Nam, Sonobe, and Otsuka, 2010 [54]; Quisumbing and McNiven, 2010 [55]). Countries are encouraged to expand and develop a robust educational system, yet many of these countries face barriers to development through human capital (Moore and Daday, 2010 [56]). Thus we conclude that although there is a significant amount of literature dealing with human and natural capital, there are clear examples of research voids and a lack of consensus on the measurement of these variables.

5. Conclusion

Based on our theoretic and empirical analysis of the available data on small tourism and natural resource dependent economies, we have managed to draw several significant conclusions. Primarily, natural capital seems to produce negative impulses in the majority of resource dependent economies, especially those that are dependent upon resources that are easily substituted or have prices that are highly prone to influence from external shock. It is our belief that of the five observed natural resource dependent economies, the only exception is Guyana. We believe that this is because the economy of Guyana is heavily dependent upon gold, which is very difficult to substitute and its price is mostly stable.

When observing similarities and differences between the resource dependent and tourism dependent countries, we find that natural capital does not significantly negatively influence economic growth in the tourism dependent economies. We believe that this is partially due to the limitation of the variable used to measure natural capital, which does very little to measure the long-term damaging effects tourism can have on the environment. We find one significant similarity, which is that the type of capital which most influences economic growth in both sets of countries primarily produces negative impulses when viewing the results of the IRF functions. The only exceptions that we found were countries that either had a highly diverse economy or had resources whose price was relatively stable in the international market and thus less prone to shock.

The main policy recommendation based on the results of our empirical analysis is that countries should attempt to diversify their economy by focusing on more than one key determinant of economic growth. Focusing on only one key segment of the economy a strategy that involves a significant amount of risk, especially the volatility of the products in the international market and possible shocks that these small economies cannot predict nor can they in any way compensate for the occurrence of such shocks. Thus, as our empirical research suggests, developing a more diverse economy significantly reduces the potential risks of foreign shock, which is highly important for the economies that we have observed.

Author Contributions: Petar Kurečić developed the theoretical framework, concept and research arguments of the paper; Filip Kokotović developed the empirical framework of the paper. Both authors wrote the manuscript and approve of the final version of the manuscript.

Conflicts of Interest: The authors declare no conflict of interest.

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Appendix A

As specified in the methodological section, we provide full results of the ADF unit root tests. The tests are conducted until the level where they reject the null hypothesis of non-stationarity at the 5% significance level. The specification of the test is with a constant and with no trend present.

Table A1. Unit root tests

Country	GDP	GFCF	HC	NC	GDPpc
Gambia	-2.243	-1.821	0.496	-0.403	-2.596
	(0.191)	(0.3657)	(0.9867)	(0.9063)	(0.1014)
In first difference	-5.585**	-5.622**	-1.839	-10.79**	-5.183**
	(0.0000)	(0.0000)	(0.3573)	(0.0000)	(0.0000)
In second difference	/	/	-6.627**	/	/
			(0.0000)		
Trinidad and Tobago	-0.708	-2.2397	1.429	-4.008**	-0.863
	(0.843)	(0.1967)	(0.9992)	(0.00318)	(0.8004)
In first difference	-2.9401*	-6.748**	-1.583	/	-2.837
	(0.04903)	(0.0000)	(0.4826)		(0.0616)
In second difference	/	/	-6.885**	/	-6.312**
			(0.0000)		(0.0000)
Lesotho	-1.096	-2.828	-1.969	-1.805	2.403
	(0.7198)	(0.0627)	(0.3008)	(0.3734)	(1.000)
In first difference	-6.949**	-6.152**	-0.583	-8.809**	-7.302**
	(0.0000)	(0.0000)	(0.8637)	(0.0000)	(0.0000)
In second difference	/	/	-6.324**	/	/
			(0.0000)		
Belize	-1.354	-1.561	1.041	-1.099	-1.841
	(0.6063)	(0.5025)	(0.9971)	(0.7081)	(0.3609)
In first difference	-3.694**	-4.319**	-1.299	-6.611**	-3.807**
	(0.00366)	(0.00183)	(0.6214)	(0.0000)	(0.0056)
In second difference	/	/	-3.614**	/	/
			(0.0055)		
Guyana	-0.0104	-1.772	-1.439	-1.646	0.115
	(0.9566)	(0.3948)	(0.5644)	(0.4508)	(0.967)
In first difference	-3.617**	-2.993*	-1.672	-8.467**	-3.789**
	(0.0094)	(0.0356)	(0.4379)	(0.0000)	(0.0052)
In second difference	/	/	-6.354**	/	/
			(0.0000)		
Jamaica	-0.764	-3.412*	-1.652	-1.289	-1.303
	(0.8285)	(0.0105)	(0.456)	(0.6261)	(0.6303)
In first difference	5.308**	/	-1.049	-4.305**	-5.134**
	(0.0000)		(0.7267)	(0.0043)	(0.0001)
In second difference	/	/	-6.391**	/	/
			(0.0000)		
Fiji	-1.985	-2.049	-1.442	-1.623	-1.262
	(0.2936)	(0.2655)	(0.563)	(0.4604)	(0.6496)
In first difference	-7.948**	-6.087**	-1.712	-5.83**	-7.896**
	(0.0000)	(0.0000)	(0.4182)	(0.0000)	(0.0000)
In second difference	/	/	-6.325**	/	/
			(0.0000)		
Liberia	-2.309	-2.505	-0.8057	-2.045	-1.614
	(0.1688)	(0.1232)	(0.817)	(0.2674)	(0.4753)
In first difference	-3.416*	-7.328**	-1.195	-6.968**	-3.744**
	(0.0157)	(0.0000)	(0.3228)	(0.0000)	(0.0067)

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In second difference	/	/	-6.327**	/	/
			(0.0000)		
Malawi	0.258	0.184	-0.439	-0.308	-1.415
	(0.9761)	(0.9717)	(0.9002)	(0.9214)	(0.5664)
In first difference	-7.895**	-4.9001**	-2.081	-5.637**	-4.047**
	(0.0000)	(0.0002)	(0.2531)	(0.0000)	(0.0012)
In second difference	/	/	-6.336**	/	/
			(0.0000)		
Barbados	-0.275	-1.001	-0.891	-2.004	-0.535
	(0.9156)	(0.7517)	(0.7917)	(0.2832)	(0.8681)
In first difference	-3.046*	-4.393**	-9.912**	-4.37**	-3.047*
	(0.0446)	(0.0022)	(0.0000)	(0.0003)	(0.044)

Source: Authors' Calculations and GRETLE output

Note: values in the parenthesis represent the p value. * and ** indicate statistical significance at the respected 0.05 and 0.01 levels of significance.

The diagnostic tests regarding the VAR models are presented in Table A2, where the results that confirm that there is no presence of the ARCH effect and no serial correlation of the residuals in the relevant equations. We present the individual ARCH and autocorrelation results for the equations that are relevant rather than the average value of all of the equations, but there is no presence of autocorrelation or the ARCH effect in any of the observed models.

Table A2. Diagnostic tests

Country	Autocorrelation GDP equation	Autocorrelation HC equation	ARCH GDP equation	ARCH HC equation
Gambia	0.115	0.028	1.372	0.159
	(0.734)	(0.866)	(0.2414)	(0.6176)
Trinidad and	0.069	0.187	0.186	0.397
Tobago	(0.933)	(0.666)	(0.6662)	(0.5281)
Lesotho	1.101	0.0046	0.692	0.034
	(0.294)	(0.946)	(0.4056)	(0.8539)
Belize	1.2003	0.354	0.669	0.129
	(0.273)	(0.552)	(0.7136)	(0.7198)
Guyana	0.473	0.0302	0.051	0.185
	(0.491)	(0.862)	(0.8205)	(0.6663)
Jamaica	0.477	0.029	0.0068	0.286
	(0.49)	(0.865)	(0.9339)	(0.5929)
Fiji	0.054	0.051	1.9119	0.549
	(0.815)	(0.822)	(0.1667)	(0.4587)
Liberia	0.075	0.271	0.1808	0.0006
	(0.784)	(0.603)	(0.6706)	(0.9801)
Malawi	0.0012	0.0069	0.295	0.2623
	(0.913)	(0.952)	(0.5873)	(0.6085)
Barbados	4.669	4.333	1.652	0.4029
	(0.198)	(0.228)	(0.1986)	(0.5256)

Source: Authors' Calculations and GRETLE output
Note: values in the parenthesis represent the p value.

The Cholesky ordering is presented in Table A3. We have experimented with changing the ordering of NC and GFCF in the model where GDP is the main variable, but found the changes to be minor and in no way changed the trend or intensity of the impulses.

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Table A3. Cholesky ordering for the IRFs

Dependent variable	Cholesky ordering
GDP	GDP, GDPpc, GFCF, NC, HC.
HC	HC, GDPpc, GDP, GFCF, NC.

The stability of the models is confirmed in Figure A1, where it can be seen that all of the inverse roots are within the bounds of the unit circle.

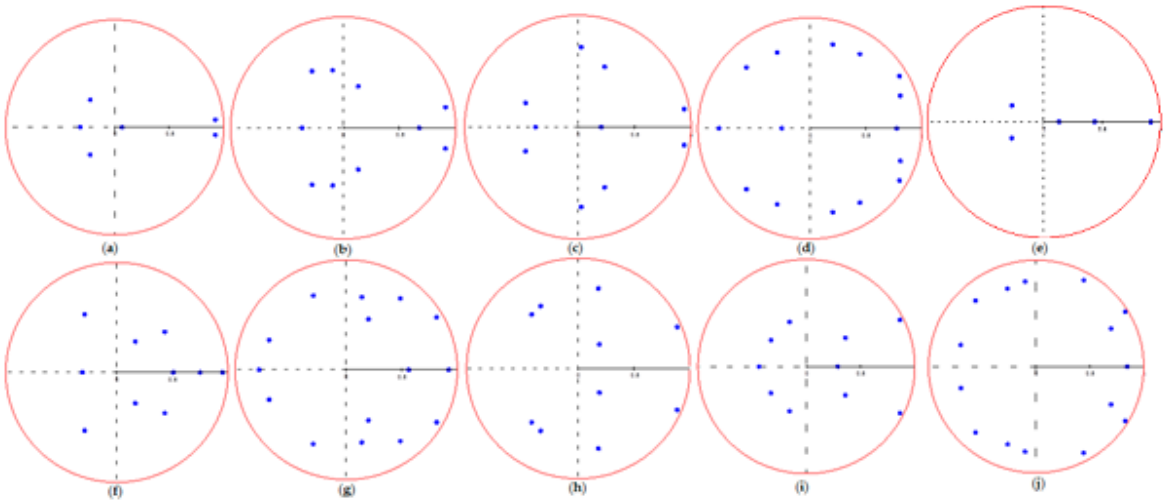

Figure A1. VAR Inverse Roots; as follows: (**a**) Gambia, (**b**) Trinidad and Tobago, (**c**) Lesotho, (**d**) Belize, (**e**) Guyana, (**f**) Jamaica, (**g**) Fiji, (**h**) Liberia, (**i**) Malawi and (**j**) Barbados.

Appendix B

Gambia is a country that has an increased reliance upon tourism, as it depends upon tourism for approximately 20% of its GDP [26]. In both sets of countries we have included countries that are not completely dependent upon tourism, nor on natural resources, but a high portion of their respected economies still depend on this sector. This was done in order to observe whether there were any differences between the countries that were completely dependent upon a particular segment of their economy in comparison to those that were less dependent on either natural resources or tourism. In the case of the countries dependent upon tourism, Gambia was that country as it is a relatively poor country with a low GDP per capita and it is highly reliant on foreign aid. The remaining economies are clearly highly dependent upon tourism as a source of revenue, which can clearly be seen from Figure B1, based on WTCT data [26].

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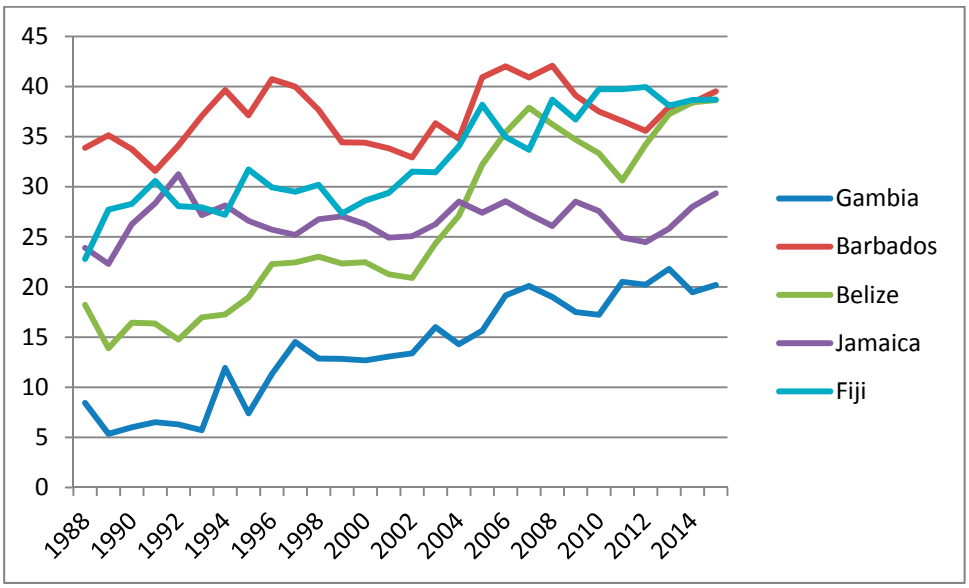

Figure B1. Total tourism revenue as a percentage of GDP

The countries from the group of natural resource dependent countries are all highly reliant on either the export of various minerals or resources as sources of revenue or they are dependent upon agriculture, such as Malawi. In figure B2 we provide the plotted figures of the Total natural resource rent, based upon World Bank data [17].

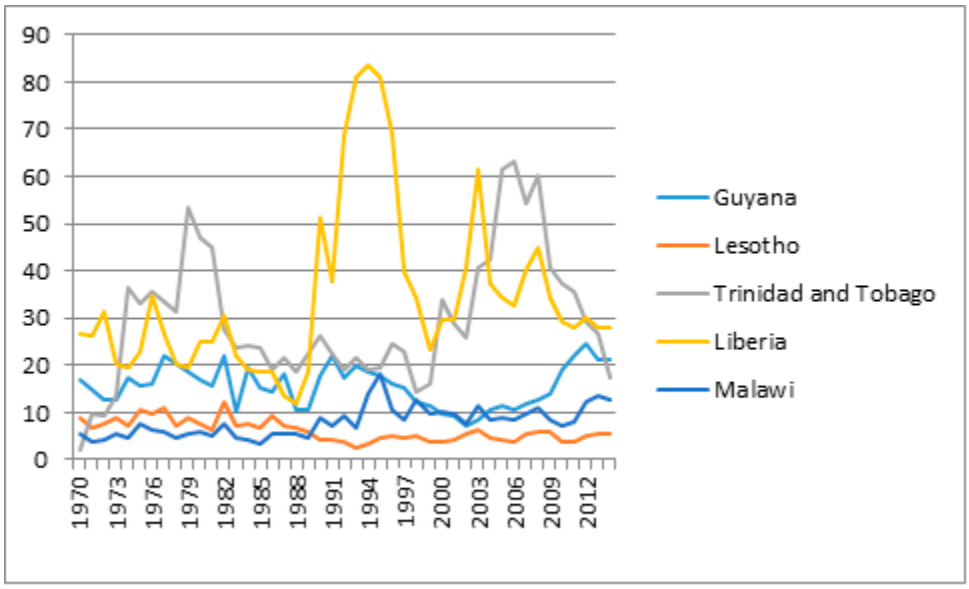

Figure B2. Total natural resource rent as a percentage of GDP

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