MONETARY POLICY IN THE ORGANIZATION OF EASTERN CARIBBEAN STATES: HOW IMPORTANT IS THE EASTERN CARIBBEAN CENTRAL BANK IN CRAFTING POLICY?

By

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This dissertation is dedicated to my family: My mother, Marie Elphita Pologne My father Theophillos George Joseph My late grandmother, Bibiane Pologne My brother Terry Pologne My sister, Sylvia Pologne and to my girlfriend: Marcia Mitchel M.S.

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ABSTRACT

MONETARY POLICY IN THE ORGANIZATION OF EASTERN CARIBBEAN STATES: HOW IMPORTANT IS THE EASTERN CARIBBEAN CENTRAL BANK IN CRAFTING POLICY?

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The research examines the effectiveness of monetary policy in improving standards of living at the local level in the Organization of Eastern Caribbean States. The study postulates that monetary policy should not be viewed strictly as the responsibility of the national government, instead, under specific conditions it can be viewed as a local economic development strategy. A combination of interviews and econometric techniques are applied to determine whether monetary policy is as useful as other more widely discussed variables in urban planning and policy making. The findings support monetary policy as a local economic development strategy in situations where certain conditions are satisfied. In addition, monetary policy is found to be equally as important as other variables more frequently discussed in the literature, such as government expenditures, employment and imported input prices.

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CHAPTER 1

MONETARY POLICY IN THE ORGANIZATION OF EASTERN CARIBBEAN STATES

1.1 Introduction

Central banks are the primary institutions responsible for crafting monetary policies for the nations they serve. Monetary policy has for many years been thought of, solely, as a strategy at the level of national government, with the central bank having the primary responsibility for crafting such policies. Together with fiscal policy, it is viewed as one half of the key strategies governments use to stabilize an economy. This study posits that there should be an exception to this way of thinking. Monetary policy can be considered a strategy for addressing the issues of local governments, in the exceptional case of the very small island nations, where the functions of local government is relegated as part of the duties of the national government. This paper will argue that monetary policy, although not typically viewed as a creature of local government, impacts local development goals in a comparable manner to more frequently discussed variables. Policymakers face the formidable task of offsetting the influence imported inputs that they are unable to do little more stabilize conditions in the countries.

The study area for this paper is the Organization of Eastern Caribbean States (OECS). The Eastern Caribbean Central Bank (ECCB) represents the primary monetary authority for the region. The OECS consists of nine member countries, eight of which are participating countries in the Eastern Caribbean Currency Union (ECCU). It is the eight ECCU participating countries, Anguilla, Antigua and Barbuda, Dominica, Grenada, Montserrat, St Kitts and Nevis, St Lucia, and St Vincent and the Grenadines, that will be examined. The ECCB is mandated by the OECS governments to promote and maintain monetary stability in the region (Retrieved November 6, 2010 from www.eccb-centralbank.org).

As the monetary authority in the region, the ECCB is responsible for creating monetary policy in the OECS. It oversees the financial and banking integrity for the OECS economic bloc of nations, which includes maintaining the financial integrity of the Eastern Caribbean (EC) dollar (Retrieved November 6,

2010 from www.eccb-centralbank.org 2010). Typically, to ensure monetary stability central banks undertake monetary policy designed to maintain one of its main goals, price stability, by keeping money supply growth in check (Arestis and Chortareas 2006). Price stability is often considered a requirement for achieving larger economic goals such as long term economic growth and low unemployment (Lucas 1980). Because the OECS countries have small, open economies, the ECCB attempts to maintain price stability by pegging the EC dollar to the U.S. dollar (Retrieved November 6, 2010 from www.eccbcentralbank.org).

These are small island nations that have limited resources and a common history of British rule (Retrieved November 6, 2010 from www.oecs.org). Local government in the region appears to be absent, either through suspension of the local government act, or because it was not established in the first place (CIA World Factbook 2010). The absence of a local government act causes the duties of local government to be relegated to the national government. This scenario enables the OECS countries to fit the exceptional case¹ mentioned previously.

The size of the individual OECS countries makes it feasible for national governments to address local development issues. The OECS countries are no larger than 800 square kilometers in size and have populations smaller than 200,000 persons, individually. In many developed countries, city government is referred to as local government. Many of those cities in the more developed countries are larger than the OECS countries, individually and as a whole, highlighting that special issues do not cause the national government to be far removed from the issues on the ground.

¹ Additional clarity will be provided about the reasons for monetary policy being considered a strategy for addressing local government development issues.

Country	Size (sq km)	Population (2010 est)	urban pop (2008 est)	GDP (2010 est)
Anguilla	91	14,766	100%	0.175B
Antigua and Barbuda	443	86,754	30%	1.099 B
Dominica	751	72,813	74%	0.375 B
Grenada	344	107,818	31%	0.645 B
St. Kitts and Nevis	261	49,898	32%	0.562 B
St. Lucia	616	160,922	28%	1.0 B
St. Vincent and the Grenadines	389	104,217	47%	1.107 B
Monsterrat	102	5,118	14%	NA
Source: CIA Wold Factbook				

Table 1.1. Population and Gross Domestic Product

Despite their common history and small size, creating policy for the OECS countries as a whole can also be problematic. An initial examination of the OECS countries shows that they vary in multiple ways. First, both the geographical area and the population of the countries differ (Table 1.1). In addition to the differences in size and population, there is no immediate correlation linking the area of the country to the number of people that reside there. Dominica, the largest island nation, physically, is amongst the least populated countries in the OECS. This leads into the second difference. Not only are there differences in density, but the level of urbanization in the countries are not determined by the size of the geographic area and the population. Third, total output can be seen to be different from each country as well. One common thread the OECS countries have is that the service sector represents the main contributor to GDP (see Figure A.1), but this is the extent of the similarity. This is primarily because of the dependence on the service sector as the main foreign exchange generator, causing the tourism industry to emerge towards the forefront of the economy. Each country, however, produces a different form of tourism. The differences among each country make it necessary for them to be examined individually. A further summary of each country economy can be found in Appendix B.

The limited resources of the OECS countries also make them dependent on foreign inputs, with foreign prices, exchange rates and trade protection all being subject to inflationary pressures (Holder and Worrell 1985). The U.S. represents the largest trading partner to most of the Caribbean islands, including the OECS nations (International Monetary Fund 2004b). One paradigm that for centuries has done a very good job in explaining price movements in the field of economics is the quantity theory of money.

Irving Fischer introduced the equation of exchange in the early twentieth century (De Long 2000), however, it had been present as early the sixteenth century (Roncaglia 2005). This theory is quite controversial among the social sciences and one of the most tested (Friedman and Schwartz 1982). Despite the differences of opinions, there is a general consensus among mainstream economists about the causal relationship between money supply and prices (De Grawe and Polan 2001). The direction of causality is from money supply to the price level (Mankiw 2000). It is important to understand the relationship between these variables for the unique case of the OECS countries.

Numerous studies support the unidirectional causality from money supply to price levels (Friedman and Schwartz 1963; Gupta and Moazzami (1991); Karfakis 2002). Many studies also find price levels also affect money supply (Rousseas 1992; Moore 1988; Palacio-Vera 2001).

Conventionally, in the quantity theory of money, the money supply is viewed as exogenous. If the velocity of money is constant and the money supply is exogenous, then controlling the money supply can achieve the central bank goals of price stability (Bernanke et al. 1999; Friedman and Meiselman 1963; Laidler 2002) and ultimately monetary stability. The exogenous money supply is the principal implication of the quantity theory of money (De Long 2002). On the other hand, by examining the implications of the quantity theory of money it is also possible to determine that the money supply is endogenous. If the money supply is endogenous, then attempting to stabilize the economy through stylized money supply rules and targets a likely to fail.

Studies addressing the varying tents of monetary policy in developing countries are inadequate. Similarly, studies framing monetary policy as a local development strategy are almost absent. In the absence of such studies, developing countries follow the larger more developed countries in terms of how they create policy (Romer 2010). This approach does not always have positive outcomes. In fact, when the developing countries do not tailor policies for their individual idiosyncrasies the effects are detrimental. Assumptions ingrained in monetary policy about the direction of causality among economic variables, if generalized, may lead to unexpected results in OECS economies.

At the national level, Gibson (1972) notes that the goals of monetary policy are designed to affect economic indicators such as gross national product, employment, output, prices and the like. Addressing

these economic indicators is important at the local level as well. Porter (1990) in his discussion of the importance of competition policy as a tool for improving indicators such productivity and output, points out the significance of paying attention to economic indicators at the local level, since they have a reverberating effect, influencing the national indicators.

In addition, Fitzgerald and Leigh (2002) identify "what economic development should be" (pg. 26) at the local level. Among the list of macro principles identified are that economic development should increase standard of living, and reduce inequality. A careful examination of the goals of monetary policy would indicate that strategies designed to increase employment and output, to name a few, also serves to achieve local development goals of increasing standard of living and reducing inequality. In the OECS countries monetary policy is useful because governments can use it as a strategy diverse ways, whether it is as a strategy at the national level or at the local level² (in this case the national strategy equates to the local strategy). The versatility of monetary policy makes it appropriate for the concentration of this study, examining the impact of monetary policy on local economic variable.

Unemployment, for example, is both a local and national issue. During periods of high unemployment, the ECCB can stimulate private investment expenditure, and possible spending on consumer goods by households, by reducing interest rates and applying additional measures that increase the supply of credit, money and other liquid assets.

The remaining sections are as follows: First, is a continuation of the introduction that includes the objectives, problem statement, and research question and hypothesis. This is followed by a review of the literature in the areas of monetary policy, exchange rate pass through, and economic development. In the next section, the data and methodology is outlined. Included in this section is a description of the interview process, the Granger causality tests, the vector error correction methods, and the reaction functions. The fourth section presents the results of the equations estimated. It is followed by a discussion of what the results mean in economic development in the OECS. Policy recommendations are then given in the next section. The paper ends with a brief conclusion.

² A further discussion equating national policy making to local policy making can be found in the section titled "Government structure in the OECS countries."

1.1.1. Objectives

Lapping et al. 1989, defines economic development as "a process of change whose goal is to increase the wealth of a community by raising incomes, increasing access to services, and reducing unemployment" p 273. This definition represents one of many different views of economic development and can be seen as one of the local economic development goals identified by Fitzgerald and Leigh (2002): improving standard of living.

The primary objective of this study is to examine the impact of monetary policy on local economic development indicators in the OECS countries. To achieve this, a historical analysis of the impact of monetary policy on the indicators of standard of living is performed. For each of the OECS countries data will be collected for economic indicators: employment, income, tax revenue, and the gini coefficient. A qualitative assessment of past policy decision on economic development issues will also be performed to complete the analysis.

In order to adequately examine the primary objective of the study, other topical areas need to be discussed as well. The topical areas to be discussed include critical issues and debates surrounding the monetary policy arena, since they need to receive sufficient attention prior to addressing the study's main focus. Addressing these critical issues and debates can be viewed as sub-objectives.

One of the primary debates surrounding monetary policy is the endogeneity or exogeneity of the money supply. The policy decisions under the assumption of endogenous money are different from those under exogenous money. Narrowly put, the proponents of exogeneity believe that either one or all of the following variables, price level, interest rate or real output is determined my movements in the money supply. On the other hand, the proponents of endogeneity flip the coin to the other side. They believe that the money supply is determined by either one or all of the aforementioned variables. The impact of monetary policy decisions on local economic variables based on the assumptions of exogeneity or endogeneity differ, which is why a deliberate attempt will be made to provide insight into the creation of money supply in the various economies.

As mentioned earlier, all of the OECS countries are dependent on foreign inputs, with their main trading partner being the U.S. If foreign factor prices increase, production costs rises and thus the general price level as well. By extension, because of the significance of U.S trade in the region, policy decisions in the U.S. that causes an increase in the OECS countries' factor inputs also influences economic variables in the OECS. The influence of foreign inputs in the OECS spurred the decision to first examine the exchange rate pass through between the U.S. and each OECS country. The study secondly tests the hypothesis that U.S. monetary policy significantly affects the OECS economies and determines the magnitude of the effect, if any.

Finally, I will examine which of the previously mentioned variables, local monetary policy, exchange rates, U.S. monetary policy, or interest rates, have the greatest impact on local economic development in the OECS.

1.1.2. Problem Statement

The decisions and procedures embedded in monetary policy are, among other things, designed to maintain economic stability and growth. Managing the money supply to effect a stable price level is one precursor to stability and growth. If the central bank is responsible for monetary policy that results in stable prices, it is by extension responsible for controlling the money supply. The degree to which the central bank controls the money supply is determined in part by the endogeneity or exogeneity of the money supply.

Whether the money supply operates endogenously or exogenously in an economy is important because of the impact it has on economic and other welfare indicators. Mainstream economics contends the money supply is an exogenous phenomenon created by the monetary authorities. It is believed that when banks reach their capacity to provide loans, new credits can only be offered if the banks receive new deposits. This happens when the central bank purchases government bonds on the open market creating excess reserves. On the other hand, endogenous money is demand driven: it is determined by the demand for loans. Monetary authorities set fixed interest rates and accommodate increases in

demand for reserves caused by bank lending. If the monetary authority refuses to accommodate increases in demand for reserves, banks are able to increase reserves for loan demand through their own initiatives in the local economy. If the money supply is endogenous, commercial banks and not the central bank ultimately control the money supply.

Research examining the endogeneity of money supply has been frequently conducted in the developed world. Unfortunately, not many studies have been performed for developing countries. Moreover, an even smaller number of studies have been performed for Caribbean countries, with the OECS being almost entirely ignored. The lack of research on the endogeneity of money supply is problematic when decisions are made without fully understanding money creation in an economy.

The financial structure in each country varies, causing the options available for the aforementioned initiatives to accommodating increases in demand for loans to differ. In some countries the possibilities for additional initiatives may be limited to the extent that it gives the impression of an exogenous money supply. Nonetheless, the exogeneity or endogeneity of money will cause monetary policy to impact the standards of living in a country differently. More specifically, the ability of banks to offer more or less loans influences economic variables such employment, income and government revenues, differently.

Assumptions about monetary policy made for developed nations do not always hold for developing countries. In addition, the problem is exacerbated when considering that the OECS has a different history from most of the developing world, such as Latin American, African and Asian countries. This difference is expounded by the physical size of the countries, and their population. None of the OECS countries have a population exceeding 200,000 persons nor does any country exceed 800 square kilometers, which places them in unique financial market from most of the other developing countries (see figure 1). Also, in developed nations, as well as, larger developing countries, monetary policy is viewed solely as a national, whereas, in many of the smaller islands of the Caribbean it is also local. When assumptions about creating monetary policy are generalized for developing countries and applied to the OECS, the outcomes may have devastating effects.

A second problem arises from the fact that each country has autonomy with respect to their international trading partners. There are also differences in the composition of the different sectors in each country economy (Appendix A). The differences in the way each country's economy function have potentially far reaching implications when crafting monetary policy region, especially with one central bank creating policy for multiple countries. The policies coming out of the ECCB are not custom-made for each country instead they are designed to address the region as a whole.

A third problem arises because of the traditional view of monetary policy. Monetary policy has been considered a tool utilized at the national level. Based on the size of the OECS countries and the structure of their governments, monetary policy can be viewed as a tool of the local government as well. By not recognizing the diverse functions of monetary policy governments in the OECS utilize monetary policy in a less than optimal manner.

In summary, three key problems arise when monetary policy is being created for the OECS countries. First, the OECS countries have smaller economies, different histories, and financial and social structures that differ vastly from larger developing countries. The lack of research addressing their unique peculiarities is a problem for the effective creation of policy. Second, the economies of each of the OECS countries differ and as a result they respond differently to policy prescriptions. The problem, thus, is having a central bank create homogeneous policies that are expected to address the needs of each island individually. Third, monetary policy is traditionally a macro tool with indirect impacts on local policy. However, because of the size of the OECS countries and their government structure, monetary policy has a much more direct impact. Failure to treat monetary policy as a local tool in the OECS countries may result in less than fully effective policy. This research is designed to address the aforementioned problems by first examining the premise for which policies are made by the ECCB, that the money supply influences the price level and not the other way around. Second, the study will emphasize the uniqueness of the OECS countries individually, by demonstrating how the variable that impact prices have varying effects on each country. This is a region that has not been adequately analyzed and I intend to lay the foundation for future research that will, address monetary policy as a local issue, as well, improve monetary policy making in the OECS countries.

1.1.3. Research Question and Hypotheses

The respective countries of the OECS rely extensively on international trade and the common currency is pegged to the U.S. Dollar. The United States is also the leading trading partner in the region. This connection with the U.S. and the idiosyncrasies that exist among the individual OECS countries leads to three research questions when examining the impact of the ECCB in achieving its mandate of price stability through monetary policy. The first and most important question directly addresses the focus of the paper: What is the impact of the ECCB monetary policy on local economic indicators in the OECS economies, individually? However, because of the importance of international trade to the OECS economies and the need to identify whether the money supply is credit driven or not, prior to answering the primary question the following questions must be asked: How important is the U.S. money supply to each of the local economies in the OECS? Third, is the money supply endogenously determined within the countries, individually? The secondary questions need to be asked since they have the potential to mitigate the impact of monetary policy.

The research hypotheses, as a result, will be tested. Because the ECCB creates monetary policy, a policy area widely believed to be dominated by the monetarist school of thought, the foundation of which rests upon the quantity theory of money, the first hypothesis tests the direction of causality that the money supply influences the price level and not the other way around. Second, the OECS currency is not only pegged to the U.S. dollar but the U.S. is the largest trading partner in the region. This leads to the hypothesis that U.S. monetary policy significantly impacts the price of goods and services at the local level in each of the OECS countries. If true, careful attention should be given to it when determining monetary policy for the region. Finally, despite the influence of the U.S. in the region, the ECCB policies in the region are believed to be sufficiently strong to mitigate its, the U.S., influence. The third hypothesis then is that the monetary policies formulated by the ECCB are the leading factors influencing price stability in each of the OECS countries and ultimately has the greatest impact on local economic variables.

CHAPTER 2

UNDERSTANDING THE OECS AND ECCB

2.1 Background

2.1.1. Formation of the OECS

The OECS countries, Anguilla, Antigua and Barbuda, the British Virgin Islands, Dominica, Grenada, Montserrat, St Kitts and Nevis, St Lucia, and St Vincent and the Grenadines, are small in size, with a combined population not exceeding 650,000 persons (www.oecs.org 2010). Because of their limited financial and physical resources, these small nations individually are unable to provide all the required infrastructure and public services for economic and social development (www.oecs.org 2010). The expected high cost provided a rationale for collaborating in the provision of services to the public. None of these countries has a system of local government although many of them have discussed establishing a system of elected councils (CIA World Factbook 2010).



Figure 2.1 Map of the OECS

In 1981, the Treaty of Basseterre was initially signed, formalizing the economic union between the OECS countries (OECS Secretariat 2008). The Treaty grew out of the need by the Eastern Caribbean Islands to play an active role on the international stage, through cooperation in external affairs representation. Also given their limited human and financial resources the treaty sets the stage for deeper economic and political integration. The Treaty, nonetheless, was based on a report on joint overseas representation for the islands after independence and therefore places considerable emphasis on the coordination of foreign policy by the member states of the OECS.

In listing the objectives of the organization, the Treaty gives primacy to cooperation in the international relations of its member states. The major purposes of the organization as described by article 4.1 of the new OECS treaty are as follows:

- a) To maintain co-operation among the Member States and at the regional and international levels having due regard to the revised Treaty of Chagaramas and the Charter of the United Nations;
- b) To maintain unity and solidarity among the member states and to defend their sovereignty, territorial integrity and independence;
- c) To assist the Member States in the realization of their obligations and responsibilities to the international community with due regard to the role of international law as a standard of conduct in their relationship;
- d) To seek to achieve the fullest possible harmonization of foreign policy among the Member States; to seek to adopt, as far as possible, common positions on international issues and to establish and maintain wherever possible, arrangements for joint overseas representation and/or common services;
- e) To establish the economic union as a single economic and financial space;
- f) To be an institutional forum to discuss and facilitate constitutional, political and economic changes necessary for the successful development of member states and their successful participation in the regional and global economies; and

g) To pursue the said purposes through its respective institutions by discussion of questions of common concern and by agreement and common action.

In addition, the member states will attempt to "coordinate, harmonize and pursue joint policies" (OECS Secretariat 2008, pp 6) in areas such as external relations including international marketing of goods and services including tourism, international trade agreements and other external economic relations, and financial and technical assistance from external sources, to name a few. This takes into consideration that there already exists separate institutional arrangements for currency and central banking and the Judiciary as well as economic integration.

The emphasis on foreign policy in the treaty is emphasized by the institutions that are created for the organization. Five key institutions are identified which will enable the OECS to accomplish its functions. The foremost institution is The Authority of Heads of Government of the Member States with the Foreign Affairs Committee listed as second. The Foreign Affairs Committee consists of the Ministers responsible for Foreign Affairs in the Governments of the Member States and with responsibility "for the progressive development of the foreign policy of the organization" (OECS Secretariat 2008, pp 4).

Despite the considerable attention that is given to foreign policy coordination and harmonization, the OECS Treaty also gives prominence to functional cooperation. The OECS came out of an organization that had already achieved a relative amount of success in terms of functional cooperation among members in technical fields and cooperation on political issues. Further, the Member States agree to attempt to "coordinate, harmonize and pursue" (OECS Secretariat 2008, pp 6) joint policies. The Treaty includes policy areas where functional cooperation already exists, such as civil Aviation, the Judiciary, Currency and Central Banking, Tertiary Education including the University, and new areas, such as audit, statistics, income tax administration, customs and excise administration, training in Public Administration and management, scientific technical and cultural cooperation, mutual defense and security, where it intended to create similar cooperation.

In forming the Treaty an account of the history of economic integration among the member states was also considered. The member states agreed to attempt to "coordinate, harmonize and pursue"

(OECS Secretariat 2008, pp 6) joint policies in the field of economic integration among the Member States through the provisions of the Agreement Establishing the East Caribbean Common Market. When the OECS was formed, the member states had already been involved in an economic integration scheme called the East Caribbean Common Market (ECCM). The ECCM was formed in 1968, one year after the coming into being of the West Indies Associated States Council of Ministers (WISA Council). Although membership of ECCM and the WISA council were the same, the two organizations operated as separate entities. They each had their own Secretariat with the WISA Council Secretariat was located in St Lucia and the ECCM Secretariat was based in Antigua. The ECCM was administered by a Council of Ministers - The Trade Ministers of the countries – and while their decisions would ultimately be ratified by their Heads of government, the latter did so, not through the collective mechanism of the WISA Council, but in their individual capacities as heads of their island administrations.

The OECS Treaty streamlined this structure, incorporating the ECCM Agreement thereby creating a single organization with the ease for functional and political cooperation and economic integration among the states of the Eastern Caribbean. The Council of Ministers of the ECCM became the Economic Affairs Committee of the OECS. The Treaty assigned to the Committee, the functions which had been previously entrusted to the Council of Ministers under the Agreement of 1968, establishing the East Caribbean Common Market. In addition, the ECCM Secretariat became the Economic Affairs division of the OECS Secretariat. The Treaty therefore essentially formalized and gave institutional expression to the informal and other aspects of the integration experience of the Eastern Caribbean States.

Although the OECS was formed from an organization, which had emerged from the failed attempt at Federation of the West Indies, and although that organization, the WISA council, had lasted for fourteen years, the OECS Treaty did not explicitly call for a deeper union or closer integration of its members. It did not declare any bold vision of a political or economic union as an ultimate goal. The Treaty stated that the second major purpose of the organization is simply "to promote unity and solidarity among the member states and to defend their sovereignty, integrity and independence" (OECS Secretariat 2008, pp i). However, by its call for the pursuit of harmonized and joint policies in the field of

economic integration and by incorporating the ECCM Agreement, the Treaty does advance the possibility of closer union and of moving towards a deeper form of integration among its members.

The opening preambular paragraph of the ECCM Agreement discloses the determination of its members "to establish the foundation of a closer union among the peoples of the East Caribbean" (OECS Secretariat 2008, pp i). It therefore laid out some principles, which if fully implemented, would have certainly laid the foundation for the closer union announced in the preamble. These included the establishment of a common customs tariff, the "abolition between member states, of the obstacles to the free movement of persons, services and capital" (OECS Secretariat 2008, pp 1) harmonized investment and development policies, a common agricultural development policy, and coordinated currency and financial policies.

By the time the OECS Treaty came into being in 1981, the majority of these principles of the Common Market had not been put in place although the ECCM Agreement had come into force thirteen years before and some of the principles were to have been implemented within three years of the signing of the Agreement. The establishment of the OECS did not lead to a renewed focus on these principles. The OECS Treaty was seen as, and in fact turned out to be, primarily a vehicle through which the member states were formalizing and quietly continuing that fourteen year process of regional integration which, during that time, had largely been concerned with functional cooperation in some fields of government that had not been very politically salient. The Treaty essentially brought into the picture – a new area of cooperation – foreign policy, specifically joint overseas representation. The initial conception of the Treaty was not conceived as a foundation or a platform for building a deeper form of union, either political or economic, and so did not commit its member states to achieving such a union in time. However the economic integration dimension of the Treaty, the ECCM Agreement, does contain elements that can be utilized in constructing such a union.

2.1.2. Government Structure in the OECS Countries

The OECS countries are single-island states. Historically, they have been a constitutional monarchy and are situated in the Eastern Caribbean. The head of state is Her Majesty Queen Elizabeth II who is represented by a governor-general despite the majority of her duties remain ceremonial. Each country has a Prime Minister who is the head of the government. The Prime Minister appoints a cabinet from parliament, whom together create policy decisions for the entire country at all levels. Each member of cabinet is given a ministry and is responsible for managing the assigned sector of the economy, such as health, education, trade, foreign affairs and community services, to name a few. Parliament comprises of the House of Assembly that includes elected members on the basis of first past the post for a term of up to five years, and the Senate of appointed members. The majority of the senate members are appointed on the advice of the prime minister, with a few others being appointed on the advice of the leader of the opposition and by the governor-general. While the senators do not make policies, they influence the decisions made by publicly debating the validity of the proposed policy.

In most of the islands, the constitution makes reference to local government but is silent on the establishment of local government. In other islands reference to local government is completely nonexistent. In the OECS, local government is viewed in a limited context with the duties restricted to the administration of services such as water, electricity, garbage disposal and the like. For many of the countries that refer to local government, the idea of local government came to a halt when a number of pieces of legislation were passed centralizing the delivery of a number of services such as solid waste disposal, and water and sewerage. In the broader sense, local issues such as education, health, and welfare are addressed simultaneously at the local and national level. The cabinet member appointed to the ministry of education, for example, in creating national policies creates education policies that simultaneously serve each community individually.

From the OECS context of local government, one of the members of cabinet, a minister, is responsible for overseeing policy formulation pertaining to local government. Local government represents an entire ministry or a department within a specific ministry designated to address community

affairs, depending on the organizational structure of the individual country. In some of the countries, the minister operates within the framework of the Local Government Ordinance, although, in countries where the ordinance exists it has been effectively suspended.

To address community related local issues the minister recommends a small number of individuals from organizations in various communities to the Prime minister, none of which are central government staff. The recommendations are approved by cabinet creating a council for the individual communities. The council then advises the minister responsible for local government on issues relating to their community. Due to the absence of effective law, the councils prioritize their issues when presenting to the minister. The consequence of this is that the services delivered by the local councils are far from uniform across the sector.

Local councils cannot be considered as revenue generating since the ministry for local government is responsible for varying and collecting taxes. The taxes collected are placed into the consolidated fund. The consolidated fund represents the location where all government revenue is placed. Based on the budgetary decisions, quarterly allocations are disbursed from the consolidated fund. The local councils are only responsible for collecting user fees. Total aggregate expenditure for local government is based on the budgetary allocation and the ministry is not permitted to set deficit budget.

2.1.3. History and operations of the ECCB

The agreement establishing the Eastern Caribbean Central Bank (ECCB) as the monetary authority for the OECS nations was signed and commissioned in 1983, in accordance with the objectives of the Treaty of Basseterre. The ECCB replaced the Eastern Caribbean Central Authority which was established in 1965. The central bank's establishment is one of only four central banks that represent multiple countries (www.eccb-centralbank.org 2010). It serves eight countries in the Eastern Caribbean Currency Union (ECCU) and has monetary authority for the economies of Anguilla, Antigua and Barbuda, Dominica, Grenada, Montserrat, St Kitts and Nevis, St Lucia, and St Vincent and the Grenadines. These island nations, together with the British Virgin Islands form the Organization of Eastern Caribbean States (OECS).

The ECCB is governed by the Monetary Council and the Board of Directors. The Monetary Council represents the highest level of decision-making at the Bank and is comprised of a Minister of Government from each of the member countries (www.eccb-centralbank.org 2010). The Council's primary role is direction and guidance on issues relating to the Bank's credit and monetary policy. The Board of Directors includes the Governor and Deputy Governor as well as a Director that is appointed by each of participating countries (www.eccb-centralbank.org 2010). The Governor and Deputy Governor are responsible for the daily management and operation of the ECCB, while the appointed Directors are responsible for the Bank's policy and general administration (www.eccb-centralbank.org 2010).

The ECCB Agreement Act provides for the establishment of the Eastern Caribbean Central Bank, its management and administration, its currency, relations with financial institutions, relations with the participating governments, foreign exchange operations, external reserves and other related matters. The Bank is described as a corporate body having perpetual succession with powers to, inter alia, regulate banking business on behalf of and in collaboration with participating governments. Its stated purposes include the promotion and maintenance of monetary stability and the promotion of a sound financial structure conducive to the balanced growth and development of the economies of participating governments.

It has the sole right to issue currency notes and coins in the territories of the participating governments and may withdraw from circulation any currency issued or deemed to be issued by it. Certain immunities and privileges are bestowed on the Bank. It enjoys immunity from every form of judicial process unless it waives this immunity. The property and assets of the Bank are immune from search, requisition, confiscation, expropriation or other form of seizure. The Governor, Deputy Governor, Directors, officers and employees of the Bank also enjoy certain privileges and immunities under the Agreement.

The Monetary Council may terminate the operations of the Bank by resolution adopted by a twothirds majority of its members.

The ECCB functions and services includes, but not limited to:

- Issuing and managing the EC currency;
- Serving as banker to the governments of its member countries and the commercial banks that operate within the ECCU;
- Provides policy advice to governments of member countries;
- Conducting and facilitating public education and community outreach programs including: Savings and Investment courses, Primary School Mentorship Programs, presentations on financial and economic issues, monthly financial newsletter and OECS Schools Essay competitions;
- Regulating and supervising the commercial banks in the ECCU;
- Facilitating institutional and infrastructural strengthening by promoting a single financial space.

The monetary policy formulation process of the ECCB follows the governance arrangements and reporting systems authorized by the ECCB Arrangement together with the established operational procedures set by the Bank (www.eccb-centralbank.org 2010). The policy formulation process focuses on the maintenance and promotion of monetary policy, financial sector stability, and the development of money and capital markets. Included in the monetary process of the ECCB is the acceptance of deposits (reserves) from commercial banks in each of the OECS countries. It also buys securities from the banks as well as sells securities to them. Additionally the ECCB makes loans to banks which are short of funds and facilitates the transfer of funds between banks. Moreover, central bank oversees the operation of banks, and often helps to stabilize the foreign exchange markets. These areas of focus are expected to aid economic growth and development in the member countries. The effectiveness of the monetary process can help determine the exogeneity or endogeneity of the money supply. The equation of exchange provides an initial framework for understanding how monetary policy operates within an economy.

CHAPTER 3

DISCUSSION OF RELEVANT THEORIES

3.1 Literature Review

Economic development encompasses more than simply creating growth or stabilization (Fitzgerald and Leigh 2002). It is also concerned about the distribution of benefits that arise from the growth generated by stabilization (Fitzgerald and Leigh 2002). As such, there are considerations that preclude growth outcomes, such as the creation and/or growing of wealth and job s, from being the only priorities of economic development. These considerations come to the forefront when development increases income inequality, irreversibly damages the environment₇ or worsens the welfare of marginalized groups-(Fitzgerald and Leigh 2002).

Monetary policy is one of a number of tools used to achieve economic development. A common belief of mainstream economists is that the monetary authorities use monetary policy to guide the economy in their intended direction. Hence, monetary policy can be seen as the management of the money supply to achieve intended economic goals. Of course, there are alternative views, such as the monetary authorities' reaction to demand conditions are created within the economy. In addition to the alternate views about the operation of monetary policy in an economy, other economic phenomena affect economic growth.

To accomplish economic growth monetary policy aims to create stable economic conditions. A common threat to achieving stability is exchange rate fluctuations. "Exchange rate movements..., play an important role in the transmission process that links monetary disturbances to output and inflation movements" (Walsh 1998, pp 241). The impact of changes in the exchange rate has been found to have varying effects globally. While in developed countries like the US McCarthy (2000) finds that the exchange rate has mixed results, he finds that Jamaica, a developing country, the exchange rate is found

to be one of the key determinants influencing economic stability (McFarlane 2002). In other small, open economies, like Sweden, the exchange rate has a relatively weak effect (Dellmo 1996 in McCarthy 2000).

In developing countries, monetary policy design is also critical because of the importance of international trade to their economies. While O'Hearn (2009) does not dispute the importance of trade to economic development, he points out that mainstream economists often allude to the 'right kind' of trade that is important for development. The 'right kind' of trade does not include goods that both developing countries and developed countries are simultaneously competitive in (O'Hearn 2009). Instead, for developing countries, it is those goods that they desire in exchange for the ones developed countries control (O'Hearn 2009). Despite the obvious inequality, economic theory continues to advocate for developing countries this same mechanism with the expectation of attaining economic development and as a means of alleviating poverty (O'Hearn 2009).

Other theorists, such as North (1990) suggest that countries can generate economic activity through the formation of relevant institutions, and the application of technology, since they have the ability to determine transformation and transaction costs. The transfer of technology is not a concept that is new to economic development, dating back to prehistoric societies (Resenberg 1984). Technology includes more than tangible products. They are also intangible, such that "their usefulness is dependent upon managerial skills, upon organizational structures, and upon the operations of incentive systems" (Resenberg 1984, pp. 247). The size of the benefits derived from the use of technologies depends on a number of factors, including "the compatibility of its factor proportions requirements with those prevailing in the specific country or available nearby" (Resenberg 1984, pp. 248), and the quality of the product produced (Resenberg 1984).

The literature review commences with a discussion on the operation of monetary policy in an economy, which includes, among other things, the impact of exchange rate in developing countries. Later, the paper examines local economic development and the tools used to achieve local economic development goals

3.1.1. Understanding Monetary Policy for Economic Development

Monetary policy can be viewed as the set of procedures undertaken by the monetary authorities to manage the money supply, exchange rates and interest rates, and to influence credit conditions to achieve economic objectives (Chibba 2007, Palley 1993). Essentially, monetary policy is one form of stabilization policies implemented by various countries as a means of addressing different economic imbalances (Chibba 2007). Sufficient coordination is necessary between monetary policy and other participant of economic policy, since monetary policy entails only the monetary portion of general economic policy. In addition, the effectiveness of monetary policy as an economic development tool differs by country. These differences includes varying levels of advancement in money and capital markets, differences in economic structures, and varying economic conditions, among others (Palley 1993).

Many economists would agree that the goals of monetary policy are price stability, low unemployment, improving economic growth and controlling external payments, in both industrialized and developing countries (Chibba 2007). These goals often are contradictory, hence the rationale for coordination among different economic policies. Diagnosing the issues is also of importance prior to implementing remedial measures. Rational monetary policy is important as a means of achieving economic goals without further aggravating already existing economic problems (Palley 1993).

To achieve economic goals there are a combination of instruments at the disposal of monetary authorities and they vary based on economic structures, political systems, and advancements in money and capital markets, to name a few (Fitzgerald and Leigh 2002). In many industrialized countries use one or more of a set of instruments that include adjustments in the discount rate, adjustments in the reserve ratio, exchange rates and open market operations, among others (Palley 1993). Developing countries also use a combination of the aforementioned variables. However, due to their difference in their production structures, the degree of association with the outside world, and difference in economic growth levels, qualitative supervisions is one option that is frequently utilized (Fitzgerald and Leigh 2002). Despite the set of instruments available for use in the creation of monetary policy, it is vital that

coordinated use of the instruments and among other aspects of general economic policy in order for rational economic policy to be implemented (North 1990).

Another pivotal debate is whether the monetary supply is endogenous or exogenous. Monetary authorities need carefully examine the economies they serve to ensure that monetary policy prescriptions appropriate. The formation of rational monetary policy also depends on understanding how the money supply is influenced in a country.

3.1.1.1. Exogenous Money

Othordox theories of monetary policy postulate that the money supply is exogenously determined by the central bank. Central banks manipulate short-term interest rates to achieve policy objectives of low inflation, and economic growth, to name a few (Hafer 2001). The assumption is that the central bank can vary the quantity of the monetary base at their discretion (Shunmugam et al. 2003, Palley 1994, Vaggi and Groenewegen 2003). As such, the orthodox view of monetary policy is linked to the equation of exchange, one of the oldest and simplest models in economics (De Long 2000, Vaggi and Groenewegen 2003):

M.V = P.Q Equation 1

M represents the money supply, *V* is the velocity of money and is assumed to be constant in the long run. *P* represents the price level, and Q is aggregate output. Aggregate output is determined by the degree of technology, and by what happens in factor markets. Because of this, changes in the money supply will cause a proportionate change in the price level. Mathematically, it is represented as follows:

$\% \Delta M = \% \Delta P$ Equation 2

In addition, the assumption of an empirically stable money multiplier, monetarists believe that the base can be controlled exogenously to achieve targeted levels of money supply (Moore 1979; Shanmugam et al. 2003). This belief has been supported empirically, primarily through the use of granger
causality tests, vector error correction models, and other vector autoregressive models (Shanmugam et al., 2003). Two of the seminal works supporting the policy implications of the quantity theory of money are *A Monetary History of the United States* by Milton Friedman and Anna J. Schwartz (1963) and "Two Illustrations of the Quantity of Money" by Robert Lucas (1980). Friedman and Schwartz (1963) discuss the influence of the money supply on the events in the U.S. economy for nearly a century. Lucas (1980) provides empirical illustrations of the implications of the equation of exchange.

Other empirical studies demonstrate support for the direction of causality moving solely from money supply to the price level. These studies include Lothian (1985), who uses cross-sectional data from member countries of the Organization for Economic Co-operation and Development (OECD), showing unanimous support for unidirectional causality assumption of the quantity theory of money. Gupta and Moazzami (1991) also find evidence of the unidirectional causality between money supply and the price level for six countries: Canada, France, Germany, Italy, the United Kingdom, and the United States. Others have found this kind of clear-cut causal direction in India (Jadhav 1994; Nachane and Nadkarni 1985; Rao 1994), Greece (Karfakis 2002), seventeenth-century France (Riley 1983), and eighteenth-century New England (Officer 2005). These studies also apply granger causality tests and/or VAR models as part of their methodology.

In effect, empirically, the orthodox approach shows that by targeting the growth rate of the money supply, among other thing, both the level of economic activity and the price level are influenced (Vaggi and Groenewegen 2003). Policy decisions that influence the level of economic activity have strong affinities to the standard of living.

3.1.1.2. Endogenous Money

As with all theories, there are alternatives to the quantity theory of money such as heterodox models that have contrasting viewpoints. These models imply that it is not money that affects prices, but instead, the price levels affects the money supply; money is endogenous (Kaldor 1982; Moore 1979; Palley 2002; Rousseas 1992). This reversal of belief has implications about the manner economic activity

is influenced and by extension the impact on standards of living. Compared to earlier periods where the money supply was a commodity, today money is largely a financial asset (Hafer 2001; Palley 2002). The heterodox models believe that the orthodox view overlook the difference in the manner of money creation between financial assets and commodities. From the Post-Keynesian perspective the endogeneity of money supply arises from changes in two areas of economic thought.³

The first is a change in factor prices, particularly, wages (Moore 1979). Wages represent one of the main factors influencing standards of living (McCann 2001, Sender 2003). Central banks supply money such that wage agreements between large unions and large firms can be met (Atesoglu 1997; Moore 1979). The second is money creation through bank loans. *Post-Keynesians* believe as banks lend out money, the money supply expands. Specifically, the quantity of production is a function of expected nominal demand; the quantity produced determines the amount of credit requested from banks; Banks as a result, provide desired loans because deposits do not constrain credit (Canale 2004). Pari passu, when the debt is repaid, the money supply contracts (Palley 2002). When the production period ends banks receive payment from the entrepreneurs for the loans borrowed at the agreed interest rate (Palley 2002; Canale 2004). Thus, the rate of interest at which money is borrowed plays a significant role in determining the (endogenous) supply of money (Canale 2004; Moore 1988; Palacio-Vera 2001). The availability and provisions of loans is also an important factor in generating economic activity in the development process (Reinert 2003, Fitzgerald and Leigh 2002), a precursor to improving the standard of living.

Similar to those in support of the quantity theory of money, *Post-Keynesians* have supported their claim empirically. Similar to orthodox studies they make use of granger causality tests and VARs (Placio-Vera 2001; Shanmugam et al. 2003). The first set of empirical studies was done for the United States and the United Kingdom (Moore 1988; Moore and Threadgold 1985; Palley 1994). Central banks unsuccessfully implemented competition and credit controls in the 1970, supporting the view that for restrictive monetary aggregates to be achieved interest rates had to be increased to unacceptable

³ Post-Keynesian Economics is mainly based on the work of John Maynard Keynes, Joan Robinson, Michael Kalecki, and Nicholas Kaldor. See Fontana (2005) for a recent survey of Post-Keynesian thought.

proportions (Moore and Threadgold 1985). Later, Post-Keynesians tested their hypothesis on the G7 countries (Howell and Hussein 1998), Malaysia (Shanmugan et al. 2003), and Spain (Palacio-Vera 2001). Empirically, the heterodox models show that monetary policy, one of the key tools in stabilizing the economy is demand determined. Hence, the money supply is not exogenously determined as proposed by orthodox models.

3.1.1.3. Monetary Policy in the Real World

The impression can be derived from many *Post-Keynesian* literature reviews that endogenous money is a belief held only by heterodox economics (Fontana 2004), as well as some monetarist models. This is far from the truth (De Long 2000; Laidler 2002). The majority of mainstream economists can be classified as "neo-monetarists" (De Long 2000: pp. 85).⁴ This debunks the notion that the quantity theory of money has hegemonic influence over mainstream economics and by extension policy formation.

Endogenous money can be found throughout economic literature. In the late nineteenth century, explanations of the origins of money began with commodity money. Money originated endogenously, in the sense that what constituted money and its supply was determined by relative transaction costs (Menger 1892). This tradition continued with some general equilibrium models that uses Karl Menger's concept of money (Kiyotaki and Wright 1992; Niehaus 1971).

In the real business cycle theory, money is also endogenous, to the chagrin of Neo-Keynesian economists: it "responds to fluctuations in output" (Mankiw 1989: pp.88). King and Plosser (1984) began building a model where money is "inside money" (pp. 367). When there is a positive economic shock, banks lend more money as firms wish to finance their expansion through debt (King and Plosser 1984). Ironically, the believers of Walrasian macroeconomics hold a view similar to Post-Keynesian monetary economics.

Numerous empirical studies find an ambiguous causal direction between money supply and price level. Sargent and Wallace (1973) argue that it is more fitting to model the causality between the price

⁴ The original monetarist models and views (Fischer 1930) were harshly criticized by the founder of the new monetarism (neo-monetarism), Milton Friedman (1956).

level and money supply as bidirectional. For India, there is considerable evidence in favor of endogenous money commencing with Ramachandra (1983). Other studies support Ramachandra findings of bidirectional causality between India's price level and the supply of money Ramachandra (1986), and Saunders and Biswas (1990). Bidirectional causality has also been found in studies based on Latin American countries (Dutton 1971) as well as Indonesia (Aghlevi and Khan 1977). Özmen (2003) confronts Karfakis (2002) demonstrating that money in Greece is not exogenous. The findings indicate the need for a multi-faceted approach in policy formation and flexibility in the instruments used to address economic conditions.

Despite the frequent use of causality as an indicator of exogeneity or endogeneity, Davidson and Weintraub (1973) warn about the dangers of relying solely on the assignment of causal status. Davidson and Weintraub (1973) point out that money supply data include erratic periods that not only question the accuracy of the data, but make the causality findings tenuous. Essentially, "imputing causality by interpreting fluctuations in time series suffers crucially from the overlooking of various anticipations which can induce a deceptive statistical lead of a money supply series ..." (pp. 1118).

3.1.1.4. Monetary Policy Implications

Policy formation has to be performed on a case by case basis. Policy makers need to determine the best approach to stabilizing the economy when monetary policy is the preferred tool. This is because money has been found to exhibit degrees of exogeneity as well as endogeneity in developing countries and developed countries alike. It is the idiosyncrasies of the country that determine the form of money that exist (Walsh 1998) and the type of policy created.

Mainstream economists believe that central banks are responsible for macroeconomic stability as illustrated through the equation of exchange, MV=PY: M is the money supply; V is the velocity of circulation of money; P is the price level; and Y is real output. According to monetarism, the money supply is exogenous, money demand is stable, and movements in the money supply temporarily precede

movements in nominal income. This implies that central bank changes in the exogenous money supply are the principal cause of macroeconomic fluctuations.

Acceptance of the heterodox view suggests that fluctuations in monetary aggregates can be driven endogenously. This has a number of policy implications. First, observation of a correlation between macroeconomic failure and contraction of monetary aggregates proves nothing about policy as a cause, which challenges monetarist claims that macroeconomic failures are largely due to poorly executed central bank control of the money supply (Palley, 1993).

Second, the endogeneity of money means that attempts to control the economy through stylized money supply rules and targets are likely to fail. The failure of monetarist policy rules is empirically confirmed by the episode of monetarist policy dominance in the UK and U.S. in the late 1970s and early 1980s. This was a period characterized by enormous interest rate and real output volatility. Goodhart's law, that any stable relationship between a monetary aggregate and economic activity will break down if the monetary authority tries to control that aggregate, is the cynic's version of the Post Keynesian claim that it is impossible to control the money supply. This suggests that policy authorities should look to other means of control. Interest rate policy is one instrument of control, but there may also be a place for quantitative regulation (Palley, 1993).

Third, endogenously driven fluctuations of the money supply play an important role in the business cycle and can contribute to instability. Unfortunately, the dynamic implications of Post Keynesian monetary theory have remained relatively undeveloped (Palley 1993).

3.1.2. Exchange Rate Pass-Through

Many economists would agree with the basic implication of the quantity theory of money, if velocity were constant. What is disputed is that equation (2) is the only policy implication from the equation of exchange. Moreover, equation (1) by itself may offer an incomplete picture of what goes on in many developing economies. When creating development policies a more complete model that improves upon the basic implications of the quantity theory of money is required.

A large part of this literature examines data from large economies (e.g. the United States, the European Union). Many of these large economies are not as dependent on foreign goods and inputs as smaller economies such as the OECS countries. Small open economies are subject to foreign monetary shocks and shocks in the exchange rate for important currencies such as the US dollar. A central bank in a small open economy cannot control these outside variables

It is well-known that small developing economies such as those in the Caribbean depend considerably on foreign inputs and technology (Holder and Worrell 1985). This is also true for larger emerging economies such as Brazil where increases in oil prices and prices of other foreign inputs and goods have generated episodes of inflation (Cline 1981; Durreval 1998). Thus, changes in the exchange rate for these countries trigger simultaneous changes in money supply and price level.

Typically, in mainstream models changes in exchange rates arise from changes in money supply. If foreign factor prices increase, production costs rise significantly, and thus the general price level will increase as well. Like the quantity theory of money, though not as extensively, a considerable body of work has been done on this inflationary transmission mechanism: the "exchange rate pass-through."

The exchange rate pass through (ERPT) refers to the extent to which changes in the exchange rate is transmitted into import prices of goods in the destination currency market (McFarlane 2002; Ghosh and Rajan 2007). This concept measures the sensitivity of import prices to a one percent change in the exchange rate (Goldberg and Knetter 1997). If the import price changes by less than one percent then the EPRT is considered incomplete (Goldberg and Knetter 1997; Ghosh and Rajan 2007). Several studies have been conducted examining the influence exchange rates have on price levels (Dornbusch 1987; Krugman 1987; Kim 1998; McCarthy 2000).⁵ However, there is an imbalance in country-samples: small open economies have not received as much attention as the U.S. and other industrialized countries (Menon 1996; Ghosh and Rajan 2007). In the Caribbean, Robinson (1996) and McFarlane (2002) study the exchange rate pass-through for Jamaica. They find that the exchange rate influences wage and price levels considerably.

⁵ Meticulous surveys of this literature are given by Menon (1995) and Goldberg and Knetter (1997).

Developing economies are more susceptible to exchange rate pass-through than developed ones (Choudhri and Hakura 2001). Ho and McCauley (2003) explain this stylized fact as a result of Engel's Law, more so than the degree of openness in an economy. Consumers in developed countries spend their money mostly on non-tradable services. Consumers in developing countries, on the other hand, devote most of their expenditure to tradable goods, directly imported or produced with imported inputs, such as food (Debelle 2001).

As a result, a change in the exchange rate will also affect money supply. The demand for imported inputs and goods is relatively inelastic in small open economies. Consumers and producers will have to spend more for the same amount of foreign currency to buy the same amount of inputs and goods. These results are consistent with those of McFarlane (2002). He shows that the nominal exchange rate Granger-causes money supply and also price level. If the exchange rate can cause money supply and price level to fluctuate in these countries, then the policy implication is clear. Monetary policy by itself may be inadequate to control inflation in these small open economies.

3.1.2.1 Exchange Rate Pass Through and Policy Formation

It is important to understand the interaction and transmission processes of the exchange rate pass through because it guides policy formation and implementation (Robinson 1998; McFarlane 2002). Developing countries face different monetary and fiscal challenges than the more advance countries (Walsh 1998; Ghatak and Sanchez-Fung 2007). Understanding these variables allows policy makers to create more effective policy and by extension improve standards of living.

The effect of exchange rate fluctuations affects a number of economic indicators as well as has varying effects among countries (Kim 1998; McCarthy 2000; Ho and McCauley 2002). Dornbush (1987), for example, found that real changes in the exchange rate also affected industry wages and employment, with competitive sectors experiencing increases in employment while less competitive sectors seeing a decline. As such, moderating the exchange rate offers a good transmission mechanism for monetary policy outside of the usual aggregate demand mechanism (McFarlane 2002).

According to McCarthy (2000), when external factors have a modest impact in the economy, declining inflation is likely a result of other more permanent factors, indicating the success of the central bank in reducing inflation. Also, with moderate influence of external factors, the impact of exchange rates and import prices will likely have a modest impact of the producer price index (PPI) and consumer price index (CPI) unless mistakes are made in policy creation.

Developing or emerging countries are more exposed to exchange rate pass through than industrialized ones, making exchange rates more of a concern in emerging markets to policy makers than developed economies (Ho and McCauley 2002; McCarthy 2000). Using Granger causality tests Kim (1998) found that exchange rate fluctuations were a cause of inflation in developed countries like the US. The impact on inflation was negative. Using impulse response functions and variance decompositions, McCarthy (2000) further found that impact of import prices and exchange rate fluctuations were modest on domestic inflation for developed countries. On the other hand, monetary policy in developing countries often includes inflation targeting, making exchange rate considerations more prominent in these countries (Ho and McCauley 2002). The effect of exchange rate pass through, nonetheless, varies among developing countries.

Ho and McCauley (2002) found that emerging markets are flexible when addressing the negative effects of exchange rate fluctuations, such as high inflationary pressures. This is possible because of the multiplicity of policy instruments the countries have at their disposal (Ho and McCauley 2002). Nonetheless, challenges present themselves when countries attempt to achieve inflation target and meet the goals of exchange rate fluctuations simultaneously. As a result, the onus is on the policymaker to communicate their policy decisions and their rationale for the actions taken (Ho and McCauley 2002). The impact of exchange rate pass through found by Ho and McCauley (2002) is contrary to what has typically been found in the developing countries of the Caribbean (see Holder and Worrell 1985).

The impact of the exchange rate pass through is found to be significant on prices in Jamaica, for example (McFarlane 2002). Low pass through offers flexibility in policy creation for moderating price volatility (McFarlane 2002). Moderation in the pass through is an indication of producers and retailers absorbing larger portions of imported inflation (McFarlane 2002). McFarlane (2002) also found that the

speed of the exchange rate pass through was slow and creates a dependence in the economy. This is because the exchange rate pass through is an indication of expected monetary shocks in the economy for both the present and the future (McFarlane 2002). The impact on prices is found to be lasting even after the effect of external factors on the exchange rate has weakened, since suppliers will still pass on the impact import prices to consumers even after income and demand recovered (McFarlane 2002).

3.1.3. Economic Development and Developing Countries

Economic development is defined as "raising standards of living and improving the quality of life through a process that specifically lessens inequalities in metropolitan development and the metropolitan population's standard of living" (Fitzgerald and Leigh 2002, pp. 27). As such, improving the standard of living is described as one of the primary goals of economic development, with the poverty line representing the minimum income required for a life sustaining standard of living (Fitzgerald and Leigh 2002). The rate of poverty, thus, is an important social indicator for shaping policies and targeting programs that benefit those most in need (USDA ERS 2004). Poverty, however, is not equally distributed among countries nor within a country, hence, strategies aimed at reducing poverty must also consider the range of unequal distribution issues that exist.

To improve standards of living, developing countries need to adopt the appropriate rules/policies and make better use of technology (Romer 2010). Porter (1990) identifies competition as prerequisite for and one of the oldest rules that have been used for economic development.

Rules govern the way individuals and businesses interact. Developed countries are more experienced at creating strategies for development that work (Romer 2010). Developing countries can learn the rules that are most effective in allowing them to grow economically by sifting through the laundry of strategies available and selecting the ones that are most appropriate for their region (Romer 2010). Similar to rules, technology can be shared without being exhausted and therefore developing countries need to better incorporate technology into their communities. Together appropriate rules and the application of technology produce desirable effects in a region (Romer 2010).

Developing countries create the policies by which they are governed (Mac Donald 2010). Lack of appropriate policies limits development (Mac Donald 2010, Mullaby 2010). Thus, it is important that developing countries create the sort of policies and strategies that enable them to grow economically. "If good rules are in place ... where the city is located doesn't matter" (Mac Donald 2010, pp. 1). Technology makes it possible to conduct business anywhere (Sassen 1998).

Constraints on development can no longer be attributed to scarce resources. Instead, it is the ability to discover and implement the strategies made available through technological opportunities (Romer 2010). The development of new technologies has the potential to increase economic development and improve standard of living at the fastest rate possible (Romer 2010). Since technology is not a scarce good, having multiple users does not reduce its availability. By sharing technology with a larger number of people, there is a greater chance of coming up with more discoveries (Romer 2010). The growth rate of new ideas increases with more potential discoveries and this makes the idea even more valuable⁶ (Jones and Romer (2010).

Because of the availability of technology, economic growth involves more than simply the accumulation of greater levels of capital and labor in the production process, (White 2008). Improvements in productivity and innovation brought about by improvements in technology enhance outputs that are important for growth. As a result, the means to improving the productivity in companies is of little consequence, whether it is through "education, social attitudes in support of innovation, national R&D funds, or transfer of skills between nations." What is important is that the end result is a productive economy (Simons 2003). A market that is competitive increases efforts from a society to be innovative (Pate 2004; Kolasky 2002).

Further, cooperation among countries offers additional opportunities, through exchange and cooperation, to generate economic activity. The benefits of exchange and corporation also improve standards of living (Godard 2006). The exchange benefits include the exchange of human resources, goods, knowledge, technologies, experiences, and art and culture all contributors to economic

⁶ Levy (2008) supports this point via a discussion of regional agglomeration i.e. firms cluster to increase the speed to which they receive they receive information about technologies and become more efficient

development (The Council of European Municipalities and Regions, 2007). Carlos (2006) emphasizes that the "added value from development co-operation as legitimacy, representatively, flexibility and capacity for adaptation is an efficient institution for solving citizen's problems" (pp. 5). Bontenbal and Lindert (2009) also point out how co-operation improves the structure and efficiency of governance and institutions, which also encourages citizen participation, thus increasing development among countries.

3.1.3.1. Economic Development Goals: Improving the Standard of Living

Fitzgerald and Leigh (2002) identify improving the standard of living of residents as one of the primary goals of local economic development. However, different countries set varying standards as acceptable minimum standards of living. The poverty line is one commonly used measure of standard of living (EDA ERS 2004). The Caribbean Development Bank identifies two forms of poverty, income poverty and non-income poverty (Thomas and Wint, 2002). Income poverty is associated with economic deprivation. It represents the inability of households to access the necessary resources for maintaining a socially acceptable standard of living (Thomas and Wint, 2002). Non-income poverty relates to non-economic issues and includes feelings or demonstrations of low self-esteem, lack of self-confidence and lack of access to political power (Thomas and Wint, 2002). Poverty, income or non-income, together with structural socio- economic conditions influence areas such as education, health care, water and sanitation, and political decision making, together create conditions of deprivation and serve to retard the development capabilities of people and communities (Thomas and Wint, 2002). A basic measure of economic activity is the gross domestic product (GDP) (Storey 2009).

Advancement in technology has been generally referred to as a main cause of economic growth (Simons 2003; White 2008; Kolasky 2002). Improvements in technology are also seen as an effective approach to improving standard of living (Romer 2010, Simmons 2003). Technological advancements create more vibrant competition in an economy (Simmons 2003; Porter 1990). Technology, for example, improves productivity, increasing the volume of output. The resulting effect is usually better prices, higher quality products, and improved standard of living for the region as a whole (Porter 1990).

A number of policies are designed to improve standard of living by improving economic development in a country. Firstly, policies that make the market more competitive contribute directly to economic growth through the creation of efficient markets (White 2008; Simons 2003; Kolasky 2002). Efficient markets allow firms to make decisions, not only in markets that contain static efficiency, but they can also incorporate other areas that are important for economic growth, such as research and development, and investment (White 2008; Simons 2003). There is little incentive to innovate without competition (Pate 2004; Kolasky 2002). As a result, the policies that are best at stimulating economic growth are those that focus on higher rates of technological progress (Simons 2003).

Other policies that contribute to improving standards of living typically operate by creating competitive environments. These policies encourage higher saving, investment, productivity improvements and innovation, and entrepreneurship, to name a few. First, saving involves the holding of resources that could have been otherwise consumed (White 2008). Other things held constant, higher rates of savings, including those used for investment, encourages economic growth (White 2008). Further, efficient investment yields greater productivity gains that boost economic growth (White 2008). Finally, higher savings and more efficient investment encourage efficient financial markets and increase entrepreneurship (White 2008).

Development policies associated with improving standards of living influence various factors with differing degrees of effect, such as employment (Bird, 1992; McMahon, 1925), income (Bird, 1992; Oppenheimer, 1982), expenditure (Chang 2003), and tax policy (Bird, 1992; Lent, 1967, Shay and Toye 1978). Addressing the factors linked with standards of living, such as employment levels, is important since it can alleviate some of the issues associated with poverty. According to McMahon (1925) a minimum wage, which is common in many countries, prohibits employers from paying employees less than a "living wage" (pp 2.).

Caribbean governments should make increasing employment levels part of the strategy to improve standards of living (Ramsaran, 1992). However, government policies in the Caribbean are intensely scrutinized because of the persistent high levels of unemployment and resulting deterioration in standards of living (Ramsaran, 1992). To address the worsening standards of living, local governments

now have to create jobs at a faster rate than they have ever done before (Ramsaran, 1992). In addition Ramsaran (1992) also believes that Caribbean governments have to contend with severe balance of payments and debt problems that are forcing them to undertake structural adjustment programs which themselves can lead to an increase in unemployment in the short term. Improving employment is not an easy task since a number of variables are connected to employment. Policymakers will have to create strategies about how they will address the variables that influence employment, either individually or in combination. Without the list intending to be exhaustive, these variables include government spending (Reinert 2003; Fitzgerald and Leigh 2002; Cornia 2003), interest rates (Cornia 2003), training (Cornia 2003; Fine 2003), inflation (Lucas 1980), monetary policy (Lucas 1980), tax policy (Cornia 2003, McCann 2001) and economic growth (Fitzgerald and Leigh 2002).

Also, levels of income is one of a complex set of factors that determine residents' well being and thus it should not be tackled in isolation when dealing with issues related to standards of living (Bird 1992). The more prosperous the economy, the greater are the opportunities for individuals to gain higher income levels. A number of variables influence income levels at varying degrees. These include consumption (McCann 2001), regional investment (Reinert 2003, McCann 2001), government spending (McCann 2001), employment (Cornia 2003; Sender 2003), government taxes (Cornia 2003), education (Cornia 2003; Fine 2003), interest rates (Cornia 2003), wages (Cornia 2003; Sender 2003), inflation (Lucas 1980) and exchange rates (McCarthy 2000).

A previously mentioned number of factors contribute to economic development. To improve standard of living, among other things, worker productivity must increase (Saxton 1995). To ensure a productive economy there is a minimum level of spending required by governments (Saxton 1995). This is to provide security, develop infrastructure, and ensure a well-functioning market, to name a few. However, excessive government expenditure has a diminishing effect on economic growth, and policy makers need to take precaution when advising governments on spending tax dollars (Saxton 1995). While government expenditures influence many variables, many of these variables also impact government ability to spend. Some of these variables are interest rates, employment, economic growth, government revenue, exchange rates and inflation (Saxton 1995).

Government ability to collect revenue is important to implementing the initiatives responsible for the success of all of the aforementioned factors attributed to improving standards of living. Government revenue collection is more of a concern for developing countries than advanced nations, primarily because of the lack of structures needed for streamlining the process (UN Habitat 2009). Overall three objectives of tax policies are identified (Bird 1992). The first is growth. An important concern in most developing countries, for example, is the rate of economic growth. The most obvious growth objective for tax policy is to provide the resources needed for public sector capital formation and other necessary development-related expenditures (Bird, 1992). The second is tax distribution. Bird (1992) believes that aside from the obvious benefits of tax incentives, tax concessions to investment may raise the rate of growth in certain situations but only at the cost of increasing inequality with which wealth and income is distributed. The third objective is stabilization. The characteristic of the tax system most relevant to the objective of price level and balance of payments stability is its elasticity with respect to changes in the level of income, that is, the extent to which tax yields rise when national income rises.

Finally Bird (1992) points out that governments are obviously constrained in what they can do when revenues do not accrue automatically as a result of economic growth and inflation but must instead be obtained painfully and openly. Variables that influence government revenues are economic growth (Fitzgerald and Leigh 2002), inflation (Lucas 1980), government spending (McCann 2001), interest rates (Cornia 2003), corporate investment (Reinert 2003, McCann 2001), exchange rates (McCarthy 2000), employment (Cornia 2003; Sender 2003), tax policy (Cornia 2003) and monetary policy (Lucas 1980).

3.1.3.2. Creating Development Policies in the Caribbean

Globally, economic development policies take various forms. It is also implemented at different degrees and multiple levels (UN Habitat 2009). When properly undertaken, policies rally the support of government, businesses and communities around a common goal. (UN Habitat 2009). To achieve this support, the process should clearly address the local needs through the identification and clarification of strategies, competitive advantages and cooperative opportunities, to name a few (UN Habitat 2009, Ho

and McCauley 2002). The success of economic development goals typically involves the satisfaction of common priorities that include the promotion of quality jobs, tax generation, and poverty reduction (UN Habitat 2009). The development process attempts to enable communities to effectively utilize labor, capital and entrepreneurship in accomplishing the local priorities, through the use of stakeholder involvement, partnerships, networking and strategic planning (Un Habitat 2009).

Achieving the goals of economic development presents more challenges for developing countries because of the lack of proportionality between the higher knowledge-based production-distribution systems of the developed countries and developing countries (Aponte-Hernandez and Molina-Iturrondo 2006). The efficient application of knowledge to the production and distribution of goods and services depends on the region's capacity (Aponte-Hernandez and Molina-Iturrondo 2006). Having the capacity to process the knowledge is important to improving the standard of living of residents (Aponte-Hernandez and Molina-Iturrondo 2006). Capacity also plays a critical role in creating the conditions and dynamics for local economic development (Castells 1998; Apone 2002). In a global economy that is knowledge driven, countries need to continue meeting the changing parameters in technology, otherwise they lose opportunities for capital accumulation and economic development (Aponte-Hernandez and Molina-Iturrondo 2006). Developing countries need to create development policies that transform and develop their institutions of higher education such that it enables the countries to overcome the conditions that make them less competitive (Howe 2000; Aponte and Molina 2002).

In the Caribbean region, for example, the strategies often used by governments to achieve the goals of economic development are a combination of low interest loans, tax benefits, and labor force training (James et al 2002). On many occasions these strategies are geared towards the goal of increasing employment opportunities for residents through the diversification of programs in the economy (James et al 2002; Blakely 1994).

Creating a knowledge based populous in the Caribbean, as a strategy for economic development comes with its challenges. A significant number of people have migrated from the Caribbean islands over the years, making the region, arguably, a net exporter of labor (Hosein et al. 2010; Nurse 2006). Among the reasons they migrate include seeking employment, better remuneration, and an overall improvement

in their standard of living (Hosein et al 2010; Cohen 1996). The large number of emigrants have now made the Caribbean one of the largest diasporic communities in the world, with the West Indies (home of the OECS countries) community in the U.S. being the largest portion of the Caribbean diaspora internationally (Hosein et al 2010; Stalker 2003). Those who migrate from the Caribbean typically include college and university graduates, management workers and other related occupations, individuals who can facilitate the economic development process in the region (Hosein et al 2010).

While Caribbean residents saw migration as a safety net for unemployment and other social ills, the excessive emigration creates gaps in the labor force and affects productivity (Williams 2007). The investment in educational training does not achieve the intended benefits to the region (Williams 2007). The Caribbean, as a result, faces the challenge of shifting from labor intensive manufacturing to a more technologically based approach. Labor intensive industries have difficulties competing globally with countries like China and other more industrialized countries (Williams 2007).

Fortunately, the location of the Caribbean islands makes them of strategic interest to the U.S. (Hornbeck 2008). The policy decisions made about trade, investment and national security, among others, have implications for the stability of the region (Hornbeck 2008). However, lack of capacity in the Caribbean countries reduces the benefits to be accrued from partnerships with the U.S. The implications of not achieving trade and other potential benefits include failure to meet World Bank outlined policies for the region. Some of which include increasing productivity, expanding trade openness, investment in infrastructure, and maintaining macroeconomic stability, to name a few (Hornbeck 2008). Further, economic development is also hampered by the high public debt in the countries. The resources that could have been used to develop social programs are being redirected to debt servicing (Williams 2007).

In light of the development challenges that Caribbean countries face James et al (2002) recommends that economic development policymakers should be cautious when applying incentives and other tools to promote growth. Policy prescription should incorporate both residents living in the Caribbean and the Diaspora.

The limited resources of the Caribbean islands make it difficult for any one country to meet the infrastructure and service needs, individually (www.oecs.org 2010). Similarly, no institution of higher

education is self-sufficient in the Caribbean that it is capable of meeting the educational needs of the region (Aponte-Hernandez and Molina-Iturrondo 2006). By collaborating, regional governments play a pivotal role in crafting policies appropriate for addressing knowledge demand and capacity necessary for economic development (Aponte-Hernandez and Molina-Iturrondo 2006). It is, thus, essential for institutions of higher education to pool their resources to meet the demand for knowledge creation, as a means of enhancing competitiveness in the region (Aponte-Hernandez and Molina-Iturrondo 2006). Without a collaborative effort to building research capacity and knowledge creation networks, Caribbean countries will remain in their present state of dependence and under-development (Aponte-Hernandez and Molina-Iturrondo 2006).

Alternatively, the Caribbean Diaspora presents opportunities for growth and development through tourism, economic and social transfers, investments in trade, entrepreneurship and human capital, to name a few (Hosein et al 2010). Unfortunately, current policy-making incorporating the diaspora fails to consider their potential contributions and thus the likely benefits have mostly been overlooked by policy makers (Hosein et al 2010).

The Caribbean region, as a result of globalization, has been responsible for migration of some of the best trained minds (Hosein et al 2010). Caribbean policy makers can address the issue of brain drain by engaging the Diaspora through viral means (Hosein et al 2010). This includes using the internet to facilitate conferences workshops and other educational programs (Hosein et al 2010). In addition, the diaspora can also invest in human capital through the transfer of equipment and technology to the relevant institutions in the region (Hosein et al 2010).

Further, investments in the real and financial sector can be done through remittances, savings, trade in goods and services, startups or business investments and foreign direct investments, among others (Hosein et al 2010). The Diasporas can set up small businesses in their home country as well as export products from their foreign residence fostering trade, among other investments (Hosein et al 2010). In addition, the migrants from the Caribbean are a unique blend of people with a common culture and identity (Hosein et al 2010). The Diaspora demand goods produced from their home country creating a niche market for the home country to export (Hosein et al 2010).

Finally, the justice sector should also play a critical role in the economic development process as well (Pollard 2000). The justice sector through the facilitation of initiatives set moral and social standards that are required by international donors for providing financial assistance (Pollard 2000). Of greater importance is the reduction in transaction cost of doing business which is beneficial in the national investment climate.

3.1.4. Overview

Economic development in many ways can be understood as a concerted effort by policymakers, among other things, to improve the standard of living of residents in a region. Depending on the goals of economic development, the scope varies in size, similarly the form of implementation differs by location. Hence there is no 'one size fits all' approach to economic development. Policy makers have to understand how social and economic variables operate in the economy. Some indicators were identified as important to monitor when undertaking economic development. Other variables were found to influence the economic indicators, with some variables playing a more active role in developing countries, such as the Caribbean, than in developed countries.

While the impact of development policy differed between developing and developed countries, it also varied among the developing countries as well. As a result, policy makers need to take a multi-faceted approach to crafting economic development policy. They need to identify the techniques or rules that work for the development region and apply these techniques. It is also suggested that, for developing countries, the benefits of the rules that work best in a community are highest when combined with the application of technology. In addition, developing countries need to look beyond some of the common conventions of theory, such as trade policy, as they may not be designed in the best interest of these countries. As a result, there need to be a proper evaluation framework in place to evaluate the relevance of development policies.

Policy makers need to pay close attention to factors such as employment (Cornia 2003), income (McCann 2001), poverty (Change 2003; Sender 2003), government expenditure (Chang 2003) and

government revenues (Reinert 2003), as they provide an indication of whether the development policy is accomplishing its intended goals. Each of these factors has a number of variables that influence them. A common goal of economic development is to improve employment by making more jobs available to residents. The provision of jobs together with other safety nets to disadvantaged groups, such as tax policy and government incentives, helps improve income levels in the region. As suggested by Fitzgerald and Leigh (2002), while the creation of wealth is important, policymakers need to evaluate the manner in which wealth is created to determine whether it is a source of greater inequality in the community. As such, poverty indices are one such approach to monitor inequality. Additionally, to ensure that it is possible to implement the policy, it is important to ensure that government collection process is adequately streamlined to accumulate the revenues needed to support implementation of development programs.

The literature highlights a number of methods to examining the variables that influence economic development in an economy. These approaches have been applied in developing countries and developed countries alike, many of which have stood the test of time. The most common methods used are Granger causality tests and Vector Autoregressive functions. They are used individually or in combination as a means of supporting each other's findings. Other methods identified were unit root tests, co-integration analyses, impulse response functions, and variance decompositions.

CHAPTER 4

ANALYZING THE INFORMATION COLLECTED

4.1 Data and Methodology

The data and methodology provide a robust and transparent approach to examining the impact of monetary policy at the local level in the OECS countries. As previously mentioned, this is a unique region where monetary policy has not been adequately investigated, based on the limited number of studies conducted on monetary policy in developing countries. For the OECS region, research is almost completely absent. In addition, to my knowledge, monetary policy has not been examined as a local level phenomenon in urban planning literature. As a result a theoretical framework focusing on, or incorporating the influence of monetary policy in the local economy is nonexistent. This gives rise to the form of research that Reynolds (1977) calls research-then-theory. In the absence of definite theories and concepts, the researcher starts with the best information available (Reynolds 1977). This approach usually involves a gradual process of developing intelligence about the study area.

The variables selected to achieve the objective of the study are selected through an iterative process. First, variables are identified that assist in understanding monetary policy's ability to achieve price stability, at the same time, having relevance to economic development. In identifying the variables interviews were conducted with officials of the Eastern Caribbean Central Bank. The interview process is described below followed by the summary of the responses. In addition to the interviews, a review of existing literature guides the variables selection. Next, the variables identified are reduced by identifying those most pertinent to the region. This includes both internal and external factors. Lastly, data limitations restrict the inclusion of some variables. The methodology section below explains each method in detail, as well as, provides justification for the approaches used.

4.1.1. Interview

The interview process has an important role in the methodology. This is because multiple functions. The first function is to provide a description of the process undertaken by the Eastern Caribbean Central Bank (ECCB) when creating monetary policy. Understanding the process involved in creating monetary policy sheds light on whether monetary policy is exogenous or endogenous. Also, the interviews help identify key indicators to be incorporated into the econometric portion of the study. Lastly, the information obtained from the interviews assist in triangulating the findings of the empirical results. The interview process consists of telephone conversations with the senior officials associated with monetary policy formulation in the ECCB. Although interviewing members of the monetary council would introduce the perspectives of persons in the ECCB at different level, they were not interviewed. The members of the monetary council comprise of the head of state of each country and their schedule did not allow them the time to be interviewed. The primary question is to determine whether the money supply is exogenous or endogenous in the OECS countries. Studies have been performed in both developing and advanced countries that show mixed results.

The objectives of the interview are to garner an understanding of the decision making process when policies are crafted for the OECS countries. This will in turn shed light on whether the money creation is endogenous or exogenous. In addition, by understanding the variables that are taken into consideration in policy formation, the variables that are most important can be determined. This is a critical component of research designed to influence policy, since the manner in which money supply is created will shape policies designed to foster economic development in the OECS countries. Identifying the variables that are considered in the policy making process, helps the analysis determine whether the policies achieve their intended goals. As such a set of open ended questions are designed to obtain responses: about whether policy is created for the OECS region as a whole or for each country individually; describing the process of monetary policy formulation, implementation and review by the ECCB; and an identification of the indicators monitored. The interview will also identify documents describing past monetary policies that have been implemented.

Prior to the interview, the interviewees were given a complete understanding of the reasons why the interview was being conducted, how the responses will be used, and the intended audience who will be privileged to the responses. To accomplish this, a telephone call was made to the interviewees explaining why the research was conducted, the purpose of the interviews and the expected audience. Following the phone call, the interviewer received written confirmation from the interviewees acknowledging their full understanding of the purpose, intent, and audience of the questions and responses. Interviewees granted permission in advance and their anonymity was protected by assigning numerical codes to each interviewee.

The questions were prepared in advance and provided to the interviewees prior to the interview sessions. This among other things ensures that the questions are clearly written and the interviewee fully understands the questions to be asked. The interviewer utilized note-taking to document the responses obtained from the interviewees. The data were then transcribed within a day of the interview sessions. The transcribing process relied on a combination of notes written and memory. In most occasions, the interview was transcribed verbatim to eliminate bias in the responses, and to give a clearer, objective picture of what was discussed. On occasions where the responses given were not clearly understood, the interviewees would be asked to clarify their statement. Information obtained from all interviewees will be grouped by topic, generalizing the responses in the analysis. The interview question is shown in Appendix C.

4.1.1.1. Summary of Interviews Responses: Creating Monetary Policy

Monetary policy for the OECS countries is created for the region as a whole. The Eastern Caribbean Central Bank (ECCB) targets the deposit rate in order to achieve price stability. The discount rate, which influences the deposit rate, is currently set at 6.5percent. Elected members of parliament from each countries form the committee that discusses the rate that is set. Each individual country's idiosyncrasies are considered when decisions are made. This gives an individual component to the

decision making process. However, the final decision is made based on the consensus of all countries. The final decision of policy such as the deposit rate is then applied to the entire region as a whole.

The process of creating monetary policy commences with the Bank's Governor and Deputy Governor informing the Board of Directors of the intention to pursue a specific policy decision. In doing so, they offer details of the intended policy decision and demonstrate the value of taking the specific action as a means of garnering support from the Board. Once the Governor has gotten the support of the Board of Directors, the board then makes the recommendations to the Monetary Council for them to consider. The Monetary Council deliberates on the recommendations and in turn offers their suggestions to the Board of Directors. Internally, it is an iterative process between the staff of the ECCB and the Board of Directors, prior to presenting a policy prescription to the Monetary Council.

The duties of the Governor of the ECCB include offering council on monetary policies and provide guidelines on credit policy to member countries. In order to identify issues that require policy attention, the Bank routinely gathers and monitors social and economic data from each of the member countries. This includes both the collection of secondary data that each country provides on a regular basis, as well as, survey data administered by the bank. In addition, the ECCB officials meet with various banking committees to keep abreast of developments in the region. The data collected, combined with the ECCB tracking global indicators allow the bank to keep updated with both regional and international trends.

Generally, the ECCB monitors a number of indicators, which suggests areas that require policy prescriptions. These indicators include information on the price of money, debt, the credit market, as well as other information contained in the national accounts. The information is sourced in each country through the statisticians, the financial secretary, the Inland Revenue Department, and the Budget Office, among others.

With the array of information collected, the ECCB is able to get a good handle on the issues that more urgently require the attention of monetary policy by systematically sifting through all the data. Because the OECS countries import inflation from the U.S., the ECCB constantly pays close attention to the peg with the U.S. dollar when creating monetary policy. In addition, to ensure the effectiveness of monetary policy in achieving the main goal of the Bank, achieving price stability, the ECCB offers the

OECS countries advice on fiscal matters as well. The recent fuel pass through system implemented in 2010 by the OECS countries and the pegging of the Eastern Caribbean (EC) dollar to the U.S. dollar represent recommendations of the ECCB on fiscal matters.

Once an issue is identified, and suggestions agreed upon by the Monetary Council, the ECCB makes recommendations detailing how the issues should be addressed by the countries. Implementation of the recommendations is then left to the countries. As needed, the Bank offers guidance throughout the implementation process and monitors the countries actions to ensure that implementation is performed as prescribed. It should be noted that it is the prerogative of each country to make adjustments to the implementation plan or proceed with implementation. In addition to monitoring the implementation process, the ECCB performs post implementation assessments to determine if the outcomes meet the intended goal. Evaluation of implemented policies is analyzed based on variations in the implementation process. The findings of the policy response are then reported back to the Monetary Council.

Once a policy has been approved by the Board of Directors, the policy decision is published in the communiques for monetary policy. The policy responses can also be found in the communiques.

4.1.2. Data Description

A combination of quarterly and annual data are collected for each of the OECS countries of Anguilla, Antigua and Barbuda, Dominica, Grenada, Montserrat, St Kitts and Nevis, St Lucia, and St Vincent and the Grenadines. The data are from multiple sources: the international monetary fund (IMF) balance of payments yearbook; the IMF international financial statistics; and the individual OECS country's statistical databanks. The data consist of eight time series: consumer price index (CPI); interest rate, import prices, individual OECS country money supply; US money supply; employment; per capita income; and government expenditure. Quarterly data are collected for CPI, interest rate, import prices, individual OECS country money supply. Quarterly data are not available for the remaining variables, and thus annual series are collected. Annual data are also collected for the OECS countries' money supply and import prices. A summary of the data are provided in Table 4.1 below.

-		Antigua and			St Kitts and St Vincent and the				
		Anguilla	Barbuda	Dominica	Grenada	Montserrat	Nevis	St. Lucia	Grenadines
Consumer Price Index		1998-2011	1999-2011	1984-2011	1984-2011	1977-2010	1984-2011	1984-2011	1984-2011
Source	IMF International Financial Statistics								
Description	Price level of consumer goods and serves purchased by households								
Money Supply		1998-2011	1999-2011	1984-2011	1984-2011	1977-2010	1984-2011	1984-2011	1984-2011
Source	IMF International Financial Statistics								
Description	Currency and Checking deposits, among other liquid assets in the OECS countries								
U.S. Money Supply		1998-2011	1999-2011	1984-2011	1984-2011	1977-2010	1984-2011	1984-2011	1984-2011
Source	IMF International Financial Statistics								
Description	Currency and Checking deposits, among other liquid assets in the U.S.								
Interest Rate		1998-2011	1999-2011	1984-2011	1984-2011	1977-2010	1984-2011	1984-2011	1984-2011
Source	IMF International Financial Statistics								
Description	The average interest rate for bank deposits								
Import Prices		1998-2011	1999-2011	1984-2011	1984-2011	1977-2010	1984-2011	1984-2011	1984-2011
Source	IMF Balance of Payments Yearbook								
	T								
Description	The cost of imports of goods and services								
Description	The cost of imports of goods and services								
Description	The cost of imports of goods and services	Anguilla	Antigua and Barbuda	Dominica	Grenada	Montserrat	St. Kitts and Nevis	St. Lucia	St. Vincent and the Grenadines
Description Per Capita Income	The cost of imports of goods and services	Anguilla 1986-2010	Antigua and Barbuda 1973-2010	Dominica 1977-2010	Grenada 1973-2010	Montserrat 1977-2010	St. Kitts and Nevis 1973-2010	St. Lucia 1970-2010	St. Vincent and the Grenadines 1973-2010
Description Per Capita Income Source	Ine cost of imports of goods and services	Anguilla 1986-2010	Antigua and Barbuda 1973-2010	Dominica 1977-2010	Grenada 1973-2010	Montserrat 1977-2010	St. Kitts and Nevis 1973-2010	St. Lucia 1970-2010	St. Vincent and the Grenadines 1973-2010
Description Per Capita Income Source Description	Ine cost of imports of goods and services IMF Balance of Payments Yearbook Gross Domestic Product per capita	Anguilla 1986-2010	Antigua and Barbuda 1973-2010	Dom inica 1977-2010	Grenada 1973-2010	Montserrat 1977-2010	St. Kitts and Nevis 1973-2010	St. Lucia 1970-2010	St. Vincent and the Grenadines 1973-2010
Description Per Capita Income Source Description Money Supply	INF Balance of Payments Yearbook Gross Domestic Product per capita	Anguilla 1986-2010 1986-2010	Antigua and Barbuda 1973-2010 1973-2010	Dominica 1977-2010 1977-2010	Grenada 1973-2010 1973-2010	Montserrat 1977-2010 1977-2010	St. Kitts and Nevis 1973-2010 1973-2010	St. Lucia 1970-2010 1970-2010	St. Vincent and the Grenadines 1973-2010 1973-2010
Description Per Capita Income Source Description Money Supply Source	Ine cost of imports of goods and services IMF Balance of Payments Yearbook Gross Domestic Product per capita IMF International Financial Statistics	Anguilla 1986-2010 1986-2010	Antigua and Barbuda 1973-2010 1973-2010	Dominica 1977-2010 1977-2010	Grenada 1973-2010 1973-2010	Montserrat 1977-2010 1977-2010	St. Kitts and Nevis 1973-2010 1973-2010	St. Lucia 1970-2010 1970-2010	St. Vincent and the Grenadines 1973-2010 1973-2010
Description Per Capita Income Source Description Money Supply Source Description	Ine cost of imports of goods and services IMF Balance of Payments Yearbook Gross Domestic Product per capita IMF International Financial Statistics Currency and Checking deposits, among other liquid assets in the OECS countries	Anguilla 1986-2010 1986-2010	Antigua and Barbuda 1973-2010 1973-2010	Dom inica 1977-2010 1977-2010	Grenada 1973-2010 1973-2010	Montserrat 1977-2010 1977-2010	St. Kitts and Nevis 1973-2010 1973-2010	St. Lucia 1970-2010 1970-2010	St. Vincent and the Grenadines 1973-2010 1973-2010
Description Per Capita Income Source Description Money Supply Source Description Employment	INF Balance of Payments Yearbook Gross Domestic Product per capita IMF International Financial Statistics Currency and Checking deposits, among other liquid assets in the OECS countries	Anguilla 1986-2010 1986-2010 1986-2010	Antigua and Barbuda 1973-2010 1973-2010 1973-2010	Dom inica 1977-2010 1977-2010 1977-2010	Grenada 1973-2010 1973-2010 1973-2010	Montserrat 1977-2010 1977-2010 1977-2010	St. Kitts and Nevis 1973-2010 1973-2010 1973-2010	St. Lucia 1970-2010 1970-2010 1970-2010	St. Vincent and the Grenadines 1973-2010 1973-2010 1973-2010
Description Per Capita Income Source Description Money Supply Source Description Employment Source	INF Balance of Payments Yearbook Gross Domestic Product per capita IMF International Financial Statistics Currency and Checking deposits, among other liquid assets in the OECS countries Penn World Tables	Anguilla 1986-2010 1986-2010 1986-2010	Antigua and Barbuda 1973-2010 1973-2010 1973-2010	Dom inica 1977-2010 1977-2010 1977-2010	Grenada 1973-2010 1973-2010 1973-2010	Montserrat 1977-2010 1977-2010 1977-2010 1977-2010	St. Kitts and Nevis 1973-2010 1973-2010 1973-2010	St. Lucia 1970-2010 1970-2010 1970-2010	St. Vincent and the Grenadines 1973-2010 1973-2010 1973-2010
Description Per Capita Income Source Description Money Supply Source Description Employment Source Description	Ine cost of imports of goods and services IMF Balance of Payments Yearbook Gross Domestic Product per capita IMF International Financial Statistics Currency and Checking deposits, among other liquid assets in the OECS countries Penn World Tables Number of persons counted in total employment	Anguilla 1986-2010 1986-2010 1986-2010	Antigua and Barbuda 1973-2010 1973-2010 1973-2010	Dominica 1977-2010 1977-2010 1977-2010	Grenada 1973-2010 1973-2010 1973-2010	Montserrat 1977-2010 1977-2010 1977-2010	St. Kitts and Nevis 1973-2010 1973-2010 1973-2010	St. Lucia 1970-2010 1970-2010 1970-2010	St. Vincent and the Grenadines 1973-2010 1973-2010 1973-2010
Description Per Capita Income Source Description Money Supply Source Description Employment Source Description Government Expenditure	Ine cost of imports of goods and services IMF Balance of Payments Yearbook Gross Domestic Product per capita IMF International Financial Statistics Currency and Checking deposits, among other liquid assets in the OECS countries Penn World Tables Number of persons counted in total employment s	Anguilla 1986-2010 1986-2010 1986-2010 1986-2010	Antigua and Barbuda 1973-2010 1973-2010 1973-2010 1973-2010	Dominica 1977-2010 1977-2010 1977-2010 1977-2010	Grenada 1973-2010 1973-2010 1973-2010 1973-2010	Montserrat 1977-2010 1977-2010 1977-2010 1977-2010	St. Kitts and Nevis 1973-2010 1973-2010 1973-2010 1973-2010	St. Lucia 1970-2010 1970-2010 1970-2010 1970-2010	St. Vincent and the Grenadines 1973-2010 1973-2010 1973-2010 1973-2010
Description Per Capita Income Source Description Money Supply Source Description Employment Source Description Government Expenditure Source	Ine cost of imports of goods and services IMF Balance of Payments Yearbook Gross Domestic Product per capita IMF International Financial Statistics Currency and Checking deposits, among other liquid assets in the OECS countries Penn World Tables Number of persons counted in total employment s Individual Country's Database	Anguilla 1986-2010 1986-2010 1986-2010 1986-2010	Antigua and Barbuda 1973-2010 1973-2010 1973-2010 1973-2010	Dominica 1977-2010 1977-2010 1977-2010 1977-2010	Grenada 1973-2010 1973-2010 1973-2010 1973-2010	Montserrat 1977-2010 1977-2010 1977-2010 1977-2010 1977-2010	St. Kitts and Nevis 1973-2010 1973-2010 1973-2010 1973-2010	St. Lucia 1970-2010 1970-2010 1970-2010 1970-2010	St. Vincent and the Grenadines 1973-2010 1973-2010 1973-2010 1973-2010
Description Per Capita Income Source Description Money Supply Source Description Employment Source Description Government Expenditure Source Description	Ine cost of imports of goods and services IMF Balance of Payments Yearbook Gross Domestic Product per capita IMF International Financial Statistics Currency and Checking deposits, among other liquid assets in the OECS countries Penn World Tables Number of persons counted in total employment s Individual Country's Database Government spending on good and services	Anguilla 1986-2010 1986-2010 1986-2010 1986-2010	Antigua and Barbuda 1973-2010 1973-2010 1973-2010 1973-2010	Dominica 1977-2010 1977-2010 1977-2010 1977-2010	Grenada 1973-2010 1973-2010 1973-2010 1973-2010	Montserrat 1977-2010 1977-2010 1977-2010 1977-2010	St. Kitts and Nevis 1973-2010 1973-2010 1973-2010 1973-2010	St. Lucia 1970-2010 1970-2010 1970-2010 1970-2010	St. Vincent and the Grenadines 1973-2010 1973-2010 1973-2010 1973-2010
Description Per Capita Income Source Description Money Supply Source Description Employment Source Description Government Expenditure Source Description Import Prices	Ine cost of imports of goods and services IMF Balance of Payments Yearbook Gross Domestic Product per capita IMF International Financial Statistics Currency and Checking deposits, among other liquid assets in the OECS countries Penn World Tables Number of persons counted in total employment s Individual Country's Database Government spending on good and services	Anguilla 1986-2010 1986-2010 1986-2010 1986-2010 1986-2010	Antigua and Barbuda 1973-2010 1973-2010 1973-2010 1973-2010 1973-2010	Dom inica 1977-2010 1977-2010 1977-2010 1977-2010 1977-2010	Grenada 1973-2010 1973-2010 1973-2010 1973-2010 1973-2010	Montserrat 1977-2010 1977-2010 1977-2010 1977-2010 1977-2010	St. Kitts and Nevis 1973-2010 1973-2010 1973-2010 1973-2010 1973-2010	St. Lucia 1970-2010 1970-2010 1970-2010 1970-2010 1970-2010	St. Vincent and the Grenadines 1973-2010 1973-2010 1973-2010 1973-2010 1973-2010
Description Per Capita Income Source Description Money Supply Source Description Employment Source Description Government Expenditure Source Description Import Prices Source	Ine cost of imports of goods and services IMF Balance of Payments Yearbook Gross Domestic Product per capita IMF International Financial Statistics Currency and Checking deposits, among other liquid assets in the OECS countries Penn World Tables Number of persons counted in total employment s Individual Country's Database Government spending on good and services IMF Balance of Payments Yearbook	Anguilla 1986-2010 1986-2010 1986-2010 1986-2010 1986-2010	Antigua and Barbuda 1973-2010 1973-2010 1973-2010 1973-2010 1973-2010 1973-2010	Dom inica 1977-2010 1977-2010 1977-2010 1977-2010 1977-2010	Grenada 1973-2010 1973-2010 1973-2010 1973-2010 1973-2010	Montserrat 1977-2010 1977-2010 1977-2010 1977-2010 1977-2010	St. Kitts and Nevis 1973-2010 1973-2010 1973-2010 1973-2010 1973-2010	St. Lucia 1970-2010 1970-2010 1970-2010 1970-2010 1970-2010	St. Vincent and the Grenadines 1973-2010 1973-2010 1973-2010 1973-2010 1973-2010

Table 4.1 Summary of Empirical Data

The interviews and literature review were instrumental in compiling variables to be included in the analysis. From the interviews a number of indicators required monitoring that were important both to the creation of monetary policy and economic development in the OECS. These indicators included the consumer price index, the deposit rate, import prices, the OECS credit market, the individual countries national accounts and the U.S. monetary policy. The review of literature also identified numerous important variables, many of which were identified in the interviews. These included, the consumer price index, the exchange rate, the local money supply, the U.S. money supply, import prices, tax revenue, employment and interest rates to name a few.



Figure 4.1 Relationship among Variables

Figure 4.1 can be used to represent either the price model or the development model. The chart shows that the dependent variable is influenced by a variety of independent variables, identified in interviews and literature review. The arrows point in both directions, indicating that there is feedback, the dependent variables also exerts influence on the explanatory variables. All the variables identified through the interviews and the literature review could not be included in the models, for various reasons. Some variables were seen as less relevant to monetary policy creation in the OECS region, while data was not available for others. As such the total number of variables in Figure 4.1 was reduced to a manageable list for the price model and the development model.

The five variables: consumer price index; interest rate, import prices, individual OECS country money supply; and US money supply; help elucidate price stability and its policy arena. Policy creation

should be performed on the basis of whether the money supply in the OECS countries is exogenous or endogenous. Such decisions are often made based on the relationship between the money supply and the consumer price index. The interest rate is often used by the authorities as a tool for influencing the price level. Also influencing price stability is the fact that Caribbean countries depend to a large extent on imports. The import prices capture the variation in international price levels that are passed into the local economies. Finally, since the US is the largest trading partner with the OECS countries, US monetary policy potentially influences price stability in the OECS. US money supply is used to examine this relationship.

Some of the variables used in understanding price stability also help in explaining the OECS countries ability to achieve development goals. Other variables such as employment, per capita income, and government expenditure are key indicators for economic development. One of the primary economic development goals in the OECS is to improve standards of living. To achieve this OECS governments typically try to increase employment as their main strategy. Increasing employment, together with alternative strategies, help increase income to acceptable levels among residents. To accomplish their development goals it is important that adequate revenue is collected to fund intended projects. Essentially, government expenditure aid in developing the workforce, securing investment and creating employment opportunities, all important criterion to improving standards of living. Other variables such as import prices and the money supply are important for improving standards of living in the OECS. Import prices provide an indication of the changes in the cost of production and the money supply make inferences about policy decisions geared towards improving standards of living.

4.1.2.1. What does the Data Say?

The quantitative data used in the analysis is examined in terms of percentages. This is done because percentage data are easier to be interpreted. Different variables are expressed in terms of different units, for example, employment is in numbers, interest rates are in percentages and the price level is in dollars. Transforming the data into percentages creates a common unit that is easier to

analyze. As an additional caveat, the primary belief of the quantity theory of money, that a percentage change in the money supply is equivalent to a percentage change in the price level, ceteris paribus, can be tested. Two models that feature prominently in the methodology, a price model and an economic development model are being estimated. As such the data are being examined from this standpoint, commencing with the data used in the price model (Table A.1). Later, the data in the economic development model (Table A.2) is discussed. The numbers in parenthesis are the number of observations.

The pricing data show that money supply in all the countries experienced positive increases. Based on the mean, in most countries, the increase is fair to moderate. Montserrat is the only country that suffered a considerable increase in the money supply (8.45percent). The average change in the money supply (M1) is greater than the average change in all other variables. In most instances, the median percentage change in the money supply supports the results of average change in money supply relative to the other variables. The only exceptions are for Montserrat, which shows that the median change in prices is greater than the change in money supply. The other country is Antigua that shows there is an approximate one to one change in both prices and the money supply. The standard deviation, for all countries suggest that there is considerable movement in most variables.

The change in the money supply on average being greater than the change in the price level is not preliminary evidence of lack of causality between the two variables. Instead, this is an indication that there is likely an inelastic relationship. If this is the case then it takes a greater than one percentage change in the domestic money supply to trigger a one percentage change in the cost of living in the respective countries. It should be noted that inferences should not be drawn from the mean changes of the variables. Instead the mean changes give an initial peak into likely possibilities that may arise in the analysis.

For the price model, Figures A.1.1, A.2.1, A.3.1, A.4.1, A.5.1, A.6.1, A.7.1, and A.8.1, reveal that in general, money supply and the price level have a similar pattern of movement. The degree of oscillation in each country varies; however, from the charts, the fluctuation does not appear to be large. The largest positive increase in inflation is 5 percent while the largest negative change is 4 percent, in any

of the countries, excepting Antigua. Antigua experienced considerable changes in inflation, with multiple quarters experiencing well over 100% change in the cost of living. To allow for better visualization of the movement between money supply and the price level in the charts, six quarters (Q2 2000, Q1 2001, Q1 2007, Q3 2007, Q4 2007, and Q1 2010) were 'smoothed' (The average of the entire series was inserted as the data point for the six quarters, since they were extreme outliers). Apart from Antigua that saw larger fluctuations in inflation relative to the money supply, the money supply in all the remaining countries saw moderate oscillation in comparison to inflation.

The fluctuations in the price level continue a similar trend throughout the entire period examined. The same holds true for the money supply. The charts thus reiterate what was found in mean suggests. There may be a causal relationship between the money supply and the price level. Also, the price level appears to have an inelastic response to changes in the individual country's money supply. The only exception is Antigua that is expected to have an elastic relationship between the price level and the money supply.

Next, Figures A.1.2, A.2.2, ..., A.8.2 juxtapose the deposit rate (IR) with the consumer price index (CPI). The graph for interest rates reveals a similar story to those for the money supply: the deposit rate moves together with the price level. The difference is that over the period examined, for all countries, the price level oscillates much more than the interest rate. Percentage changes in the interest rate in most cases do not exceed 1percent. The exception is for Anguilla and St. Vincent. Percentage changes in the interest rate fluctuates more than the other countries, after 2005 the rate fluctuated significantly less. Overall changes in the interest rate show consistency in fluctuation, akin to those of the consumer price index.

Import price data are only available annually for the Organization of Eastern Caribbean States (OECS). As a result, to obtain quarterly data, each year is divided by four giving an average quarterly number. This approach introduces serial correlation into the data series and gives an average trend, as opposed to an actual trend in import prices. Nonetheless, the information in Figures A.1.3, A.2.3, ..., A.8.3 also show that there is similarity in the movement between import prices and the consumer price index.

The patterns in the data are logical, taking into consideration two features in the OECS economies. Like most small open economies, the OECS is highly dependent on foreign inputs and other comestibles. The OECS countries, like other Caribbean countries, also have a large tourism industry. These characteristics should make the price level in the OECS sensitive to imports, especially with the U.S., which is the largest trading partner with the OECS countries, both in the importation of goods, as well as tourists.

As shown by Figures A.1.4, A.2.4, ..., A.8.4, with the exception of Anguilla, Antigua and Montserrat, the percentage changes in U.S. money supply (USM1) and inflation are very similar. However from the second quarter in 2008 the USM1 fluctuate more rapidly than changes in the price level. Overall USM1 tend to track the price level in the individual countries very well.

The data used in the development model show positive increases for each of their variables for all of the countries (Table A.2). All countries experienced a moderate to considerable increase in the money supply. Like the pricing data, the average change in money supply is greater than all other variables in five of the eight countries. The median supports the findings of the average data that the money supply had a larger increase than the other variables. The only countries with variables that experienced a larger average increase than the money supply were Anguilla (imports and government expenditure), Grenada (government expenditure), and Montserrat (per capita income). Montserrat is the only country with per capita income (INC) as the variable with the largest percentage increase.

Similar to the price study, the variables that are larger than INC indicate the possibility of inelasticity between the respective variable and INC. Pari passu, when income is larger than the other variable then that is an indication of possible elasticity. An elastic relationship between INC and another variable mean that a one percentage change in the variables brings about a greater than one percentage change in INC.

Figures A.9.1, A.10.1, ..., A.16.1 also show percentage changes in the money supply compared to percentage changes in per capita income. The similarity between the movements in the two variables is quite striking. What is even more noticeable is that per capita income follows the money supply as close as the other variables more frequently discussed in local economic development studies, despite it

not being considered in local economic theory. Although the oscillations in the money supply generally is larger than per capita income. The percentage change in the fluctuations is not much different.

Figures A.9.2, A.10.2, ..., A.16.2 then contrast percentage changes in employment to percentage changes in per capita income. The charts show that the two variables move well together. Per capita income fluctuates more than employment. This is supported by the average fluctuations shown in the tables. Grenada employment has the most striking semblance of per capita income, with percentage changes in employment almost equaling that of per capita income in all years.

The results of Figures A.9.3, A.10.3, ..., A,16.3 also juxtapose government expenditures to per capita income. Overall, the charts show that government expenditures and per capita income are more closely related than any other variable. Despite the greater fluctuations in government expenditure than per capita income, the strength of their correlation is clear. The relationship between the two variables is expected to be elastic, as supported by the tables. The only exception is Montserrat, where an inelastic relationship is expected.

Percentage changes in import prices relative to changes in per capita income are similar to those found in money supply and employment (Figures A.9.4, A.10.4, ..., A.16.4). Movement in per capita income closely follows that of import, and the relationship between the two variables is expected to be strong. Similar to most of the other variables, there is expected to be an elastic relationship between import prices and per capita income, with the exception of Montserrat, where the relationship is expected to be inelastic.

As mentioned in the price model, tourism forms a large part of economic activity in all of the OECS countries, and the primary industry in most countries. The tourism industry is responsible for a significant portion of output and employs a large number of people. The mean of import prices supports the close relationship between import prices and per capita income.

In conclusion, it should be understood that the findings of the data description, in this section, are preliminary. They do not possess the rigor that is presented in the analysis section of the study. Instead the data description gives an initial indication of likely trends.

4.1.3. Methodology

The data collection and analysis for this study utilizes three approaches: interviews; vector error correction models (VECMs); and Granger causality tests. The interviews provide the first glimpse into the study area and serve a dual purpose in the empirical process. The first is to guide the variable selection for estimation purposes. The interviews provide an indication of the variables that are important to policy making in the OECS by the policy makers. It also offers insight into the thought process involved in the creation of policy and hence rationalizes the decisions made. The second purpose is to triangulate the responses of the interviews with the findings of the VECM and granger causality tests. Combining the empirical results with the interview responses increases the validity of the analysis.

The vector error correction model is a restricted form of the vector autoregressive (VAR) model that is specifically designed for this situation (i.e. when the theory is not clear on the model and variables). The VECM has a sufficiently rigorous design that enables it to estimate equations where the theory is lacking (Pindyck and Rubinfeld 1998).

Pindyck and Rubinfeld (1998), Gujarati (1995) and others identify conditions when the VECM can be used. These conditions include: situations when theory in not sufficient to determine the exact specification. Developing countries often fall into this category, since most theory are created with more industrialized countries in mind; situations when the theory may be too complicated to allow one to precisely derive a specification from first principles, thus a careful and thoughtful ad hoc specification must be made; and situations where there is disagreement about what is the right theory. The debate about whether the money supply is endogenous or exogenous is an example in economics.

All of which are conditions for this research. Structured models are created based on well developed or tested theory and thus less useful for this research topic. Because structured models treat possible misspecification differently from non-structured models, the results of inadequately specified models face a greater risk of being spurious (Gujarati 1995).

The VECM, on the other hand, is designed to address possible misspecifications (Pindyck and Rubinfeld 1998; Gujarati 1995). It offers additional analysis options, outside of the estimated equation, not immediately present through alternative models. One other option is the impulse response functions.

The impulse response functions provided in either the VAR or the VECM represent a common approach to examining the central bank reactions to economic conditions (see Senbet 2011; Kaytanci 2008; Galbraith, Giovannoni and Russo 2007 and others). The impulse response refers to the reaction of any dynamic system in response to some external change. In the VECM, the standard errors reflect dispersions of the replicated impulse responses. The replicated impulse responses originate from random samples repeatedly drawn from the asymptotic distribution found in the VECM coefficients.

Senbet (2011) examines the central bank monetary policy reaction function for four countries, the United States, Canada, the United Kingdom, and Japan to determine to what degree policy makers respond to inflation and output gaps. Kaytanci (2008) examines the performance of Turkey's monetary policy by evaluating the relationship between monetary policy and economic variables. To do so, the Central Bank of Turkey's monetary policy reaction function is estimated using a vector error correction (VECM) model. Galbraith, Giovannoni and Russo (2007) used a VAR to understand the operations of the Federal Reserve in the American economy using three variables, term structure, unemployment, and inflation. Iklaga (2008) examines the relationship between Nigerian economic development and the Central Bank's response through the setting of its interest rate using a VAR to estimate the Central Bank of Nigeria reaction function. The model uses interest rates, output, inflation and exchange rates.

In addition to estimating the central bank's reaction function (and examining the issue of endogeneity of the money supply), vector autoregressive models (VARs) are the most frequently used approaches to assessing the impact of monetary policy on economic indicators (Iklaga, 2008; Kaytanci, 2008; Senbet, 2011). The literature, both theoretically and econometric, shows a preference for parsimony and the models are found to be sufficiently well specified to permit inference of the parameters (Galbraith, Giovannoni and Russo, 2007; IKlaga, 2008). The empirical evidence from the VARs could help determine the manner in which monetary policymakers react to key economic developments (Iglaga, 2008; Senbet, 2011). The outcome of such studies "provide a basis for macroeconomist and market participants to base

assumptions on the monetary policy stance" (Iklaga, 2008, pg 3). While monetary policy formulation and implementation are typically standard, country peculiarities exist (Iklaga, 2008; Senbet, 2011), validating the use of VAR models.

Finally, the Granger causality helps confirm the statistical relationships derived from the VECM equations. The Granger tests, statistically, attempt to detect the direction of causality between two variables when, temporally, there is a lead-lag relationship (Gujarati 1995). "More generally, since the future cannot predict the past, if variable X (Granger) causes variable Y, then changes in X should precede changes in Y" (Gujarati 1995, pp 621). It is an important probabilistic mechanism (Reynolds 1977) for inferring causality that has stood the test of time and is applied in multiple schools of thought. However, the causality should not be solely determined based on whether one variable precedes another, hence the triangulation of methods.

The approaches used in the methodology are not without their limitations. The information obtained from the interviews cannot be generalized. The interview data, despite being a rich, in-depth source of information, is specific to the Eastern Caribbean Central Bank and is not applicable to all central banks. The interviews also suffer from subjectivity. It is hardly possible for the interviewee to not include their personal views in the responses they provide. Further, the information received from the interviews, depend on the quantity of information the interviewees are willing to divulge. A number of conditions may restrict the interviewee from being completely open, including company security reasons and other personal reasons, to name a few.

The VECM estimates time series data that often is encumbered by structural breaks. Structural breaks make it difficult to analyze unit root tests and cointegration analysis. Since the VECM utilizes cointegration methodology, data issues that affect unit root tests and cointegration tests also affect vector error correction models. In situations where the data set is limited, degrees of freedom are lost through differencing. The problems associated with small data sets are further heightened. Finally, time series data do not always become stationary after first differencing; they sometimes require higher order differencing. In some instances, variables requiring higher order differencing may have to be dropped

from the equation despite being of importance to the model developed. One downside of having to drop variables is the model suffering from specification error.

The Granger causality test, like the VECM is subject to structural breaks in the data. Depending on the use of the Granger causality tests specification bias may also be an issue. This is even more likely when VECM are estimated.

4.1.3.1. Granger Causality

The Granger-Wald Causality tests are performed prior to estimation of the vector error correction model (VECM). It is used in combination with the interviews to explore the issue of endogeneity of the money supply. The VAR model treats every endogenous variable as a function of its own lagged values, as well as lagged values of all the other endogenous variables. The causality tests we perform have a mathematical formulation similar to that of the VAR equation. The Granger causality test assumes that the information relevant to the prediction of two variables, X and Y, is contained solely in the time series data of these variables.

This approach to determining whether 'X' causes 'Y' identifies how much of the current 'Y' can be explained by past values of 'Y' and then to see whether adding lagged values of 'X' can improve the explanation. It is important to note that 'X' Granger causes 'Y' does not imply that 'Y' is the effect or the result of 'X'. This is because Granger causality measures precedence and information content.

The fundamental assumption of Granger causality is the concerned series should be a stationary process. The test involves estimating the following regressions:

$$\begin{split} Y_t &= \alpha_0 + \alpha_1 Y_{t-1} + \ldots + \alpha_\lambda Y_{t-\lambda} + \beta_1 X_{t-1} + \ldots + \beta_\lambda X_{t-\lambda} + \varepsilon_t & \text{Equation 3} \\ \\ X_t &= \lambda_0 + \lambda_1 X_{t-1} + \ldots + \lambda_\lambda X_{t-\lambda} + \delta_1 Y_{t-1} + \ldots + \delta_\lambda Y_{t-\lambda} + \mu_t & \text{Equation 4} \end{split}$$

where 't' represents the time lag and (ε,μ) are the error terms with the usual properties, independently and normally distributed random variables with zero mean and constant variance. The disturbance terms are also assumed to be uncorrelated. "The equation postulates that current Y values
are related to past values of Y itself as well as of X. It further postulates a similar behavior for X" (Gujarati 1995, pp 620). The reported F-statistics are the Wald statistics for the joint hypothesis:

$$\beta_1 = \beta_2 = \dots = \beta_\lambda = 0$$

for each equation. The null hypothesis is that X does not Granger-cause Y in the first regression and that Y does not Granger-cause X in the second regression.

4.1.3.2. Vector Error Correction Method

A vector autoregressive model (VAR) describes a set of k variables (endogenous variables) as a function of their past values and all other lagged values in the system (Gujarati 1995). The approach was developed to address the estimation of equations when the theory is either lacking or in disagreement. The cointegrating restrictions discussed previously are not considered in the VAR. On the other hand, the VECM is a restricted form of vector autoregression with the specification containing cointegration restrictions enabling it to incorporate non-stationary series that are cointegrated (Quantitative Micro Software 2000). The VECM is based on the realization that time series data possibly contain a unit root, leading Engel and Granger (1987) to postulate that "... a linear combination of two or more non-stationary series may be stationary" (Quantitative Micro Software 2000, pp 487).

The stationary combination is said to be integrated of order zero or I(0) and the non-stationary time series are cointegrated. The I(0) combination represents the cointegrating equation and reflects the long run equilibrium relationship between the variables. This is accomplished through the VECM specification simultaneously controlling the long run behavior of all endogenous variables at the same time permitting a broad range of short run dynamics. The resulting cointegration term is called the error correction term because the deviations from long-run equilibrium go through a gradual process of short-run adjustments.

Clearly, when estimating VECM unit root and cointegration tests must be performed in advance, essentially making them part of the methodology. The VECM used takes a two step approach. The first

equation identifies whether the money supply is endogenous or exogenous. Then, the findings of the first equation are used to determine how money supply is treated in the second equation.

4.1.3.2.1. Unit Root Test

Under vector error correction methodology, unit root tests form an integral part of co-integration theory, since cointegration theory relates to a linear combination of non-stationary series. Unit root tests are a common approach used in testing the stationarity of a series, since the stationarity of a series is often determined by whether the series follows a unit root process. This study performs the Augmented Dickey-Fuller (ADF) unit root test.

To perform the unit root test, the ADF first considers the following AR (1) process:

$$Y_t = \mu + \rho Y_{t-1} + \varepsilon_t$$
 Equation 5

where Y_t is a stationary series, μ and ρ are parameters, and ε_t is assumed to be white noise.

To perform the test the equation is estimated by subtracting y_{t-1} from both sides. The resulting equation is as follows:

$$\Delta Y_t = \mu + \gamma Y_{t-1} + \varepsilon_t \qquad \qquad \text{Equation 6}$$

Where $\Delta Y_t = (Y_t - Y_{t-1})$ and $\gamma = \rho - 1$

The ADF test juxtaposes the null hypothesis H_0 : $\gamma = 0$ against the alternative H_1 : $\gamma < 0$. The test statistic follows a Dickey-Fuller distribution (instead of a Student's t distribution). If that statistic is to the left of the critical value, the test fails to reject the null hypothesis; thus, the series would not be I(1).

In addition, the Augmented Dickey-Fuller test takes into account higher order serial correlation by adding lagged differences of the dependent variables. Thus, the regression the ADF test uses for an AR(k) process would be:

$$\Delta Y_{t} = \mu + \gamma_{1} Y_{t-1} + \delta_{1} \Delta Y_{t-1} + \dots + \delta_{k} \Delta Y_{t-k} + \varepsilon_{t}$$
 Equation 7

where k is the number of lags.⁷

The lag length, k, is determined in the testing process. This study uses the Likelihood Ratio (LR) and the Aikake Information Criterion (AIC) tests to determine the lag lengths for the series.

The unit root tests will be performed on variables in natural logarithmic form. The small perturbations found in these data series can be annihilated by transforming them into natural logarithms. Furthermore, our interpretation of the estimated regression coefficients becomes independent of units of measure when variables are in natural logarithmic form (they are elasticities).

4.1.3.2.2. Cointegration Test

Once we have determined that the series are I(1), we can test for whether or not a linear combination of them is integrated of order zero (I(0)) or *stationary*. A stationary linear combination of series is one with a time-invariant variance. This can be interpreted as a long-run equilibrium relationship between the variables. The Johansen (1991, 1995) cointegration methodology is based on vector autoregressions (VAR).

Essentially we take a vector autoregression of the following form:

 $Y_{t} = A_{1}Y_{t-1} + A_{2}Y_{t-2} + \dots + A_{k}Y_{t-k} + Bx_{t} + \varepsilon_{t}$ Equation 8

where Y_t is an m-vector of endogenous variables, x_t is a j-vector of exogenous variables and t is a vector of impulses or innovations.

 $k_{max} = int[12\{(T+1)/100\}^{0.25}],$

where T is the number observations over time.

⁷ The number of lags, k, is selected according to Schwert (1989), who proposed:

For the VAR, and for the vector error correction model (VECM) that follows, the number of lags was set to four according with the Final Prediction Error (FPE), Likelihood Ratio (LR), and Aikake Information Criterion (AIC) tests. All three tests suggest the same number of lags. Other tests such as the Schwarz's Bayesian Information Criteria (BIC) and the Hannan and Quinn Information Criteria (HQIC) suggest the use of two lags in the model. The optimal lag structure will be used, because under specifying the number of lags in a VECM would increase the sample bias and lead to serial correlation (Gonzalo 1994).

This VAR is transformed by subtracting y_{t-1} from both sides, together with adding and subtracting other terms. In the end, we obtain:

$$\Delta y_t = \Pi y_{t-1} + \sum_{i=1}^p \Gamma_i \Delta y_{t-1} + Bx_t + \varepsilon_t$$
 Equation 9

In this case, *p* is the number of lags, and in our specification it is equal to four in the price model and two in the economic development model.

The key to Johansen's test is in the rank of the matrix *P*, denoted as *r* and referred to as the *cointegrating rank*. If r < m, then there exist two $(m \land r)$ matrices, *a* and *b*, such that $P = ab \land$ and by_t is stationary. The interpretation of the test results would then be that rank *r* is "the number of cointegrating relations" (Quantitative Micro Software 2000: p. 520).

4.1.3.2.3. Vector Error Correction

Vector error correction models (VECMs) are designed to encompass the dynamics in both the short-run and long-run (Engle and Granger 1987). Two VECMs will be estimated. The first model is a price dynamics model, which among other things, examines the issue of exogeneity of the money supply. The second is an economic development model, which among other things, examines the impact of monetary policy on standards of living. The theoretical process undertaken in estimating the price dynamics model is described below. Since the economic development model follows the same process as the price dynamics model, only the final equation to be estimated is provided. To estimate a VECM, a

model that corrects short-run disequilibrium and reconciles it with long run equilibrium, the long-run model must first be considered. The long – run model is as follows:

$$CPI_{t} = \alpha_{0} + \alpha_{1}MS_{1t} + \alpha_{2}USMS_{1t} + \alpha_{3}IR_{1t} + \alpha_{4}IMP_{1t} + \mu_{t}$$
 Equation 10

Where Y is the dependent variable, MS represent the individual country money supply, USMS is the U.S. money supply, IR is the interest rate and IMP is the cost of imports of goods and services. t represent the variable in time t. μ is the error term with the usual features. All variables are transformed using natural logarithms. Despite equation (8) is used to estimate long-run equilibrium, it is possible for the short-run to be in disequilibrium. A simple dynamic model that adjusts short run disequilibrium can be written as follows:

$$\Delta CPI_{t} = \beta_{0} + \beta_{1}\Delta MS_{1t} + \beta_{2}\Delta USMS_{1t} + \beta_{3}\Delta IR_{1t} + \beta_{4}\Delta IMP_{1t} + \beta_{5}\mu_{t-1} + \nu_{t} \qquad \text{Equation 11}$$

Where Δ is the first difference operator and V is a random error term. Changes in the dependent variable are determined by short-run and long-run forces through μ_{t-1} that measures equilibrium error from the previous period. Thus rewriting equation (8) and solving for μ_{t-1} yields the following result:

$$\mu_{t-1} = CPI_{t-1} - \alpha_0 - \alpha_1 MS_{1t-1} - \alpha_2 USMS_{1t-1} - \alpha_3 IR_{1t-1} - \alpha_4 IMP_{1t-1}$$
 Equation 12

Substituting equation (10) into equation (9) and rearranging the variables generates the following error correction equation:

$$\Delta CPI_{t} = (\beta_{0} - \alpha_{0}\beta_{5}) + \beta_{1}\Delta MS_{1t} + \beta_{2}\Delta USMS_{1t} + \beta_{3}\Delta IR_{1t} + \beta_{4}\Delta IMP_{1t} + \beta_{5}CPI_{1t-1}$$

$$-\beta_{5}\alpha_{1}MS_{1t-1} - \beta_{5}\alpha_{2}USMS_{1t-1} - \beta_{5}\alpha_{3}IR_{1t-1} - \beta_{5}\alpha_{4}IMP_{1t-1} + v_{t}$$
 Equation 13

If a long-run relationship exists between the dependent variable and the explanatory variables in equation (8), then the variables should be co-integrated. The Engle and Granger (1987) approach follows the approach previously described: the first procedure is to test the error term in each of the parameters in equation (8) for the presence of a unit root. The unit root test is estimated from the equation above; the second procedure is the cointegration test. Engle and Granger demonstrates that if co-integration is found among the set of variables in equation (8) then the cointegration equation can always be transformed into a VECM of the form in equation (11). Equation (11) shows the short-run the price dynamics for VECM equation can be rewritten as:

$$\Delta CPI_{t} = \lambda_{0} + \lambda_{1} \Delta MS_{1t} + \lambda_{2} \Delta USMS_{1t} + \lambda_{3} \Delta IR_{1t} + \lambda_{4} \Delta IMP_{1t} + \lambda_{5} CPI_{1t-1} - \lambda_{6} MS_{1t-1} - \lambda_{7} USMS_{1t-1} - \lambda_{8} IR_{1t-1} - \lambda_{9} IMP_{1t-1} + V_{t}$$
Equation 14

Equation (12) includes the effects of both short run and long run behaviours of changes in the dependent variables. The expected coefficient signs for equation (12) are λ_1 , λ_2 , λ_3 , λ_4 , λ_5 , λ_6 , λ_7 , λ_8 , and λ_9 >0. The short-run economic development equation can be written as follows:

$$\Delta INC_{t} = \lambda_{0} + \lambda_{1} \Delta MS_{1t} + \lambda_{2} \Delta EMP_{1t} \lambda_{3} \Delta EXP_{1t} - \lambda_{4} \Delta IMP_{1t} + \lambda_{5} INC_{1t-1} - \lambda_{6} MS_{1t-1} - \lambda_{7} EMP_{1t-1} - \lambda_{8} EXP_{1t-1} + \lambda_{9} IMP_{1t-1} + v_{t}$$
Equation 15

where INC is personal income, EMP is employment, and EXP is government expenditure. The expected coefficient signs for equation (13) are λ_1 , λ_2 , λ_3 , λ_4 , λ_5 , λ_6 , λ_7 , and λ_8 , >0 λ_4 and λ_9 <0. The long-run equation for the price model (14), which is identical to equation (8) and economic development model, equation (15) are the equations estimated, and are as follows:

$$CPI + \beta_1 MS_{1t} + \beta_2 USM 1_{1t} + \beta_3 IR_{1t} + \beta_4 IMP_{1t} + \varepsilon_t$$
 Equation 16
$$INC + \beta_1 MS_{1t} + \beta_2 EMP_{1t} + \beta_3 EXP_{1t} + \beta_4 IMP_{1t} + \mu_t$$
 Equation 17

4.1.3.3. Reaction Functions

Estimation of the reaction or impulse function for the estimated VECM is captured in the error term. The impulse response analysis is used to analyze the dynamic interactions between endogenous variables (Pfaff 2008). An impulse response function (IRF) describes the expected impact (response) of a variable y_{it+s} to a unit change (shock) in variable y_j . An IRF is useful because the cointegration equation, equation (7), explains the long run relationship among the analyzed variables but falls short in explaining the impact of an impulse variable over the response variable over time.

An orthogonal impulse response function (OIRF) is an IRF for which a Cholesky decomposition is applied to the error variance covariance matrix. The OIRF is used when the underlying shocks are less likely to occur in isolation (Pfaff 2008). This is reflected in the correlation among the components of the error.

The orthogonal impulse response function graphs show the effect the natural logarithm of the CPI of a one-time, one percent shock in one of the explanatory variables.

CHAPTER 5

WHAT DO THE DATA SAY?

5.1 Results

5.1.1. Granger Causality

The Granger causality tests together with the interviews, among other things, provide a possible indication of whether the money supply is exogenous or endogenous. Conventional theory advocates that the direction of causality moves from the money supply to the price level, suggesting that that monetary policy is exogenous. Proponents of endogenous monetary policy believe that the direction of causality is from the price level to the money supply. The Granger causality test explores the exogeneity or endogeneity of the money supply by indicating whether the change in one variable is preceded by the change in another variable. The Granger causality tests are first examined for the price model and indicate that the direction of causality varies among the countries between CPI and the explanatory variables (Table A.3.1 to Table A.10.2). For St. Kitts and Dominica it was found that causality is bidirectional. For St. Lucia, the money supply Granger causes inflation, with consumer prices influencing the money supply only after a one lag period. For Grenada, the finding is opposite to St. Lucia. Inflation Granger causes movement in the money supply. Money supply only influences the price level after a two lag period. The remaining countries exhibiting causality, namely Anguilla, Montserrat and St. Vincent indicate that the direction of causality moves from CPI to money supply after one lag, two lags, and one lag respectively. No causal relationship between money supply and the price level was found for Antigua.

A puzzling result is found between the U.S. money supply and inflation. The strength of causality appears to move from the price level to the U.S. money supply. Dominica, St. Lucia and St. Vincent all show strong unidirectional causality moving from CPI to USM1. Grenada also supports this finding with the only direction of causality moving from USM1 to CPI being in lag three. St. Kitts and Montserrat found bidirectional causality. For St. Kitts, the CPI Granger caused USM1 from lag one to lag three, while USM1

Granger caused CPI from lag two to lag six. For Montserrat USM1 Granger caused CPI from lag two to lag four. CPI Granger caused USM1 in lags two and five. The only causal relationship found for Antigua was after the first lag. No causal relationship was found for Anguilla.

St. Vincent is the only country that showed the direction of causality moved from interest rates to the price level. This relationship was found for all lags. Dominica, Grenada, Montserrat and St. Lucia all found the direction of causality moving from inflation to interest rates. The lag indication causality differs for each country. Anguilla, Antigua and St. Kitts found no causality between the variables.

Only half of the countries examined found a Granger causality relationship between imports and the price level, namely Dominica, Montserrat, St. Lucia, and St. Vincent. For Dominica the direction of causality was from inflation to import prices and occurred from lag two onwards. Montserrat found bicausality, which took place in lag six. Bi-causality was also found in St. Lucia. However, the direction of causality was from CPI to import prices in lags one and two. Import prices Granger caused CPI in lags one, three and four. Finally, import prices Granger caused inflation over all the lags examined.

A limited causal relationship was found in the price model among the variables for Anguilla and Antigua. Only one lag in one variable indicated causality in each of the two countries.

In the development model, the direction of causality was primarily found to exist from INC to the money supply, with five out of the eight countries, Anguilla, Antigua, Grenada, St. Lucia and St. Vincent, supporting this finding: Anguilla in lags one to three; Antigua in lag one; Grenada in lags one to five; St. Lucia in lags two and four; and St. Vincent in lags four to six. The findings showed that the direction of causality for St. Kitts was from the money supply to per capita income in lag one.

The findings for employment were mixed. Three countries showed the direction of causality was from income to employment, one country found the opposite to be true, while another country found bicausality between the two variables. Antigua, St. Kitts and St. Vincent all showed unidirectional causality from income to employment. Anguilla found unidirectional causality from employment to income and bidirectional causality was found for St. Lucia.

The Granger causality tests for government investment showed that all the variables exhibited some form of causality in the development model. The results are mixed. Bi-directional causality was

found in four countries, namely Anguilla, Grenada, St. Kitts and St. Lucia. Unidirectional causality was found in the remaining countries with the direction of causality moving from income to government investment in Antigua, Dominica, and St. Vincent. For Montserrat the direction of causality was from government investment to income.

As expected, causality between import prices and income is also mixed among the countries. Unidirectional causality moving from income to import prices was found in Dominica, Grenada and St. Vincent. Granger causality moving in the direction of import prices to income was found in St. Lucia, and bi-directional causality was found in Anguilla, Antigua Montserrat.

5.1.2. Vector Error Correction Model

Unit root tests were performed on all data series for each country in both models. Prior to performing the tests, the variables were transformed using natural logarithms. Transforming the variables using natural logarithms enables small perturbations in the data to be annihilated. In addition, the interpretation of the estimated regression coefficients of the variables becomes independent units of measure. The coefficients are interpreted as elasticities.

All variables are tested for the presence of a unit root at the 1percent, 5percent, and 10percent critical level (Table A.11.1 and Table A.11.2). If the Augmented Dickey-Fuller (ADF) test statistic is less than the critical value then we reject the null hypothesis that the data series contain a unit root. Possessing a unit root, among other things, is an indication that the data are not stationary and the results of the estimated regression may be spurious. The ADF test also allows for the specification of a lagged first difference structure. Sufficient lags should be included that is sufficient to remove any serial correlation in the residuals.

The unit root tests were estimated with a constant and a linear time trend. For the variables used in the price models, most of the series are integrated of order one (I(1)). The remaining series are integrated of order two (I(2)). Similar to the price model, all variables in the development model either achieved (I(1)) or (I(2)). The Durbin-Watson statistic is used to test for the presence of serial correlation.

After differencing, serial correlation was no longer found to be problematic in series. However, based on the error correction methodology, despite one or more variables not achieving (I(1)), we can proceed to determine whether the linear combination of variables are co-integrated.

Now that we have determined all the series are (I(1)) and (I(2)), we can test to determine whether the linear combination of the models in each country are integrated of order zero (I(0)). A stationary linear combination of series is one with a time-invariant variance. This can be interpreted as a long run equilibrium relationship between the variables. The number of co-integrating equations each will contribute to an error correction term involving a different linear combination of the levels of the series.

Johansen co-integration tests are estimated including an intercept and trend in the co-integration equation. The results of the cointegration tests can be seen in Table A.12.1 and Table A.12.2. The lag structure included is determined based on the Likelihood Ratio test (LR) and the Akaike Information Criteria (AIC). Four lags were deemed optimal for the price model and two lags are optimal for the development model. Tests are performed at the 5percent and 1percent significance level. The co-integration tests indicate that there are either one or two co-integrating equations for all countries at the 1percent level in both models. There is one co-integration equation at the 5percent level for both models. Given the results of the co-integration tests, the error correction models can be estimated, by incorporating the lagged error terms from the co-integrating models.

Prior to estimation, all variables were transformed using natural logarithms. Similar to the unit root tests and co-integration tests, the transformations enables the coefficients of the variables to be interpreted as elasticities. Despite all variables in both the price model and development model do not achieve (I(1)) we proceed with estimating the vector error correction model (VECM). This is because the co-integration tests indicate that there is a long run relationship in all the models. As such, the estimated equations examined are long-run models. Since the unit root tests found that some variables were (I(1)) and others were (I(2)), the variables that were (I(2)) sere first differenced prior to estimation. This allows for all data series to be interpreted as (I(1)) in the VECM. The results of the models can be seen in Table 5.1 and Table 5.2, respectively. The absolute t-statistics are shown in parentheses. The pricing model estimates the price level (CPI) for each country as a function of the local money supply (M1), the U.S.

money supply (USM1), interest rates (IR), and import prices (IMP). For the development model, per capita income in each country is estimated as a function of M1, employment (EMP), government expenditures (EXP), and IMP.

	CPI	M1	USM1	IR	IMP	Constant
Anguilla	1.0000	-0.63276	-0.01073	-1.01216	0.962166	0.007052
		(2.23756)	(0.362080	(4.10083)	(3.1413)	
Antigua	1.0000	2.235206	0.247604	-0.04955	1.231271	0.004588
		(3.99219)	(2.15356)	(0.09660	(2.96065)	
Dominica	1.0000	-0.6471	-0.03957	0.425581	-0.6957	-0.03845
		(2.82174)	(1.21443)	(2.63841)	(5.24321)	
Grenada	1.0000	-0.41349	0.041081	1.513062	0.394957	-0.01477
		(2.09415)	(0.99786)	(4.61448)	(2.31354)	
Montserrat	1.0000	1.085885	-0.29687	0.281902	-0.48546	0.02984
		(1.27982)	(2.88597)	(0.58055)	(2.41051)	
St. Kitts	1.0000	-1.1448	0.093489	1.237374	1.268975	0.08158
		(2.5361)	(1.21225)	(2.45622)	(2.16835)	
St. Lucia	1.0000	-1.09874	-0.00956	1.950586	1.479522	0.010382
		(4.32013)	(0.21074)	(4.38161)	(5.41844)	
St. Vincent	1.0000	-1.28227	-0.18334	8.182691	-0.7518	-0.02791
		(2.67421)	(2.25832)	(2.89644)	(2.169620)	

Table 5.1 Vector Error Correction – Pricing Model

In the price model (Table 5.1), the output for Anguilla can be interpreted as follows. A 1percent change in the money supply, for example triggers a 0.63percent change in CPI. Similarly, a 1percent change in USM1 causes the price level to change by 0.01percent. Similar changes in Interest rates and import prices are expected to result in a 1.01percent and -0.96percent change in CPI.

Overall the impact of the money supply on CPI varies. In countries like Anguilla, Dominica and Grenada, there is an inelastic relationship between the two variables. While in other countries such as Montserrat and St. Lucia, M1 approximates to a one-to-one relationship. The remaining countries have a more elastic relationship between money supply and the price level. Of greater interest than the magnitude of the coefficient, is the sign attached to the coefficients. In six out of the eight countries we found a positive relationship between the money supply and CPI. The coefficient of money supply in most cases meets its expected sign. Further examination of the two exceptions is required to determine the source of the negative relationship.

The U.S. represents the largest trading partner with the OECS countries, however, in most instances the t-statistic attached to the variable is not significant. In addition the magnitude of the U.S. money supply is smaller than the other variables, which is an indication of the impact of U.S. monetary policy relative to the impact of the other variables. For most of the countries, there is also a positive relationship between USM1 and the price level, suggesting that an increase in the long run money supply results in an increase in CPI in the OECS, in general. The only countries with a negative relationship between USM1 and CPI are Antigua, Grenada, and St. Kitts. Since the coefficient of USM1 is less than one in all the countries, a 1percent change in U.S. money supply results in a less than proportional change in the price level in the OECS.

It is expected that there will be a positive relationship between interest rates and CPI. In six out of the eight countries, the models did not meet their expected signs. The remaining two countries, Anguilla and Antigua, showed a positive relationship between CPI and the interest rate. An elastic relationship is found in many of the countries between the two variables, for St. Vincent, the coefficient is unusually large at 8.18percent. Further research needs to be performed to get to the root of this unusually large coefficient.

It has been widely discussed that the Caribbean countries, and in particular OECS countries depend heavily on imports. The results confirm this, with import prices being significant in all countries. The magnitude of the coefficient is among the largest sizes in all models. The results show an inelastic relationship between CPI and import prices (IMP) in five out of the eight countries. The comparative size of the coefficient of import prices to the other variables is consistent with the belief that the OECS countries may be importing inflation. In most instances the findings show a negative relationship between the eight countries and CPI. The exceptions to the case are Dominica, Montserrat and St. Vincent.

	INC	M1	EMP	EXP	IMP	Constant
Anguilla	1.0000	-0.88597	-1.36543	-6.08807	-3.61928	-4.74684
		(0.87574)	(5.25066)	(2.59791)	(2.55052)	
Antigua	1.0000	3.248387	0.339525	-1.95392	4.349265	-9.8107
		(2.22108)	(2.71053)	(0.8113)	(2.49069)	
Dominica	1.0000	1.713522	0.067441	2.197877	1.192889	5.300841
		(2.61929)	(0.79808)	(3.06779)	(2.29356)	
Grenada	1.0000	0.182191	0.126801	0.692423	0.284168	0.253446
		(3.24958)	(5.00063)	(6.872390	(5.05092)	
Montserrat	1.0000	1.002361		0.726248	0.445698	0.082613
		(2.84776)		(2.68421)	(3.14873)	
St. Kitts	1.0000	0.789583	-0.01257	-1.73612	-2.26361	0.001029
		(2.09016)	(0.1415)	(2.33323)	(2.5868)	
St. Lucia	1.0000	2.077172	-0.31405	1.448042	2.867906	-0.07474
		(4.31292)	(2.46358)	(2.25214)	(3.19952)	
St. Vincent	1.0000	-2.5849	0.161381	-3.39527	-3.75889	-8.27887
		(2.00214)	(1.24432)	(3.59839)	(5.0825)	

Table 5.2 Vector Error Correction – Development Model

The development model can be interpreted in a similar manner to the price model (Table 5.2). Again using Anguilla as an example, the development model suggests that a 1percent change in the money supply causes a 0.89percent change in per capita income. Similarly, a 1percent change in employment triggers a 1.37percent change in INC. The remaining two variables government spending and import prices causes a 6.09percent and 3.62percent change in income for a 1percent change in each variable, respectively.

Monetary policy is the recommended addition to local economic development. The results show that in six of the eight countries, there is a negative relationship between income and the money supply. The only two exceptions are Anguilla and St. Vincent. In addition, four countries suggest that there is an elastic relationship between the two variables. These are Antigua, Dominica, St. Lucia and St. Vincent. The equation for Montserrat indicates there is an approximate one-to-one relationship between INC and M1. The remaining countries suggest there is an inelastic relationship between the two variables.

Prior to estimating the equations employment was thought to be the most correlated variable to income. The results indicate that INC has the smallest coefficient among all the explanatory variables. In addition, employment is for to have an inelastic relationship with income in all but one country, Anguilla. For the most part the coefficient on employment (EMP) is spilt among the OECS countries. Four of the seven countries with models that include employment show a negative relationship between EMP and INC.

In the OECS, government expenditures appear to be one of the more important variables. In six of the eight countries there is an elastic relationship between government expenditures (INV) and INC. The only two countries reporting an inelastic relationship are Grenada and Montserrat. The signs on the coefficients are split between the two countries. Closer examination of the nuances on each of the countries needs to be made to determine the main cause behind the signs.

The impact of imports on per capita income is expected to be very important in the development model, similar to CPI. The results show second to government expenditures, IMP is the most essential variable, based on the magnitude of the coefficients. Like INV six of the eight countries show an elastic relationship between import prices and income. The two countries with an inelastic relationship are

Grenada and Montserrat. Most of the country's models indicate a negative relationship between the two variables. The exceptions are Anguilla, St. Kitts and St. Vincent.

5.1.3. Reaction Functions

The analytic asymptotic standard errors are reflected in orthogonal impulse response function graphs. The asymptotic distribution is calculated such that each repetition draws a random sample from the asymptotic distribution of the VECM coefficients. The standard errors reflect standard deviations of the simulated impulse response across replications. Figure A.17 to Figure A.24 and Figure A.25 to Figure A.32 show the effect of the natural logarithm of the CPI and per capita income of a one time, one percent shock in one of the explanatory variables.

We first look at the reaction functions for the price model (Figure A.17 to Figure A.24). In most instances the curves return to zero, indicating that the onetime shocks do not permanently affect the price level in the OECS countries. The effect on the price level shows different patterns of behaviors throughout the region. There are two countries that demonstrate a permanent effect on CPI in the reaction functions, Anguilla and Dominica, as shown by the money supply curves not returning to zero. In the case of USM1, Anguilla's, Grenada's and St. Kitts' curves indicate a more permanent response of the price level to a one time shock in U.S. money supply. For the interest rates and import prices, the two countries that are exceptions are St. Kitts and Grenada, respectively. Similarly, the reaction functions (RF) curves show that the variables have varying influences on CPI, with these influences being both negative and positive.

The patterns of behavior also vary between variables in each country. Using the RF graphs for Anguilla as an example, a different pattern is presented in price level in response to a shock in the money supply and as a response to a one time change in import prices. At first there is a positive short term effect. The magnitude of the effect can be seen to be different between the variables. This initial effect is followed by a negative response in both M1 and IMP. In this instance both the magnitude and the direction of the response are negative. Similar variability can be found in the price models for each of the countries.

The RF curves for the development model (Figure A.25 to Figure A.32), in most cases, tell a similar story to the price model. Most of the graphs return to zero, suggesting that the onetime shocks do not permanently affect the per capita income in the OECS countries. The main exception is in the case of St. Vincent. None of the curves return to zero, implying that the one-time shocks permanently affect INC in St. Vincent. The effect for money supply and government expenditure are positive, while the remaining two variables have a negative effect. Other than St. Vincent, three of the four RF curves for Antigua and Grenada, also show that impact of the shock is permanent. The effect in all three instances is negative for both countries. The money supply has a temporary effect on income in Antigua and import prices in Grenada are the lone variables with a temporary effect.

The remaining development models for countries seem to follow the price models, in terms of variability. With the exception of Antigua, Grenada and St. Vincent, the effect of a one-time shock in the money supply has a temporary effect in all of the remaining countries, despite the magnitude of the effect varying among the countries. Employment has a permanent effect in Anguilla and Dominica. Three of the five remaining countries have temporary responses to shocks in government expenditures, namely Anguilla, Dominica and Montserrat. While none of the remaining countries have a permanent effect to import prices.

The reaction functions corroborate the results. Variables in both the price modes and development models behave differently in each of the OECS countries.

CHAPTER 6

MAKING SENSE OF THE FINDINGS

6.1 Discussion

The primary objective of this paper is to examine the impact of monetary policy at the local level in the OECS. More specifically to determine whether, in this unique OECS region, monetary policy can be utilized for accomplishing one of the goals of local economic development - improving standards of living for residents. In the process, a number of techniques were utilized to gain a better understanding of the economy and the instruments used to achieve economic development goals and ultimately address the research questions.

The main methodological approach used is the vector error correction model (VECM). Two models were estimated, a price model and a development model. This approach was used in combination with interviews, the reaction functions and causality tests. Because the Eastern Caribbean Central Bank (ECCB) is the institution responsible for crafting monetary policy, the price model was first estimated to determine whether the monetary supply in the OECS is endogenous or exogenous. But the price model does more than examine the endogeneity of money supply. Instead, it provides insight into how each country in the OECS varies from another.

The price model suggests that the variables affect price stability differently in all the countries. This can be seen in the variation of the coefficient signs as well as the magnitude of the coefficient.

The common assumption that the money supply proportionately affects the price level does not hold true in the OECS. From the VECM, a positive co-integrated relationship was found between money supply and CPI in most countries, with the money supply in most cases having a larger than proportionate effect on inflation in the long run. In addition, findings of the reaction function were mixed. This is an indication that conventional economic theory does not always apply in this region. The Granger causality

tests show that, in most instances, the direction of causality moves from CPI to the money supply, otherwise there is bi-causality. These findings, combined with the interview results indicate that the ECCB monitors economic and financial activity in an economy, and works within the local economies when creating policy responses. The combined information is indicative of endogeneity of the money supply existing in the OECS region.

The finding that monetary policy is endogenous suggests that money comes into existence driven by the requirements of the real economy. The banking system reserves expand or contract as needed to accommodate loan demand at prevailing interest rates. Monetary policy would, thus have to play an accommodative role in meeting the reserve requirements of the banking sector.

The impact of monetary policy can also be discussed through the real purchasing power of money. Expected growth in the money supply reduces the real purchasing power of money, alternatively, expected increases in productivity increases the real purchasing power of money. The demand for loans can be viewed in alternative ways. One such way is that the choices made by individuals about the level of contribution to productivity can increase the real value of money. Governments can stimulate or discourage the demand for loans by seeking the cooperation of the banking sector. As a strategy to increase productivity through employment, governments together with the banking sector can agree offer reduced interest rates on workforce development loans in special areas of interest.

In countries like the OECS banks may be capital constraint. Banks can obtain reserves either through the interbank market or through the ECCB, with the ECCB being the more likely option. The heads of government of each country form the highest level of decision making in the ECCB. Thus the monetary council can ensure that monetary policy is accommodative to the banking sector's reserve requirements.

Based on the size of the economies in the OECS, the natural expectation is for U.S. monetary policy to have a greater impact on the individual country's price level. It turned out to be the least important variable in most models. However, it is possible, as pointed out in the interviews, that the close monitoring of U.S. policy allows the ECCB to successfully counter a significant portion of the effects of USM1.

The interest rate reinforces the endogenous finding of the relationship between M1 and CPI. The line of causality predominantly moving from CPI to the interest rates is suggestive that the ECCB sets it rates in response to economic activity taking place in the local economies.

Import prices is possibly the most important variable in the price model. This finding is not solely based on the size of its coefficient. It is stated in the interviews that the OECS countries are importing inflation. This may be a driving factor explaining the inflationary behaviors in the islands. As explained in the exchange rate pass through discussions, economies that have a large tradable sector are more susceptible to exchange rate pass through (ERPT). All of the economies in the OECS have large tradable sectors. While the ECCB may successfully address the impacts of U.S. monetary policy, inflationary factors such as rising oil prices, and the rising costs of inputs used for production, for example, filters into the price equation for the countries.

In the development model, government expenditures and import prices are the primary variables responsible for influencing standards of living in the OECS countries. Similar to the price model, in most instances M1 has an elastic relationship to per capita income. The finding that the money supply is endogenous explains the direction of causality moving from INC to M1. It was noted earlier that, although the ECCB does not create or implement fiscal policy, they advise the local governments on actions that affect economic activity. This level of involvement by the Central Bank at the local level allows the monetary policies created by the ECCB to effectively filter into local economic development and influence standards of living. The negative relationship between money supply appears counter-intuitive. Conventional theory assumes there is a positive relationship between M1 and income, at least from a macroeconomic perspective. But this may not be the case for this region. To understand the inverse relationship between the money supply and income, one only needs to look at the remaining variables.

It is easy to assume that standards of living can be improved by improving employment levels. However, these islands are growing rapidly with limited options for employment. The OECS countries have not sufficiently diversified their economies, relying on one or two sectors to sustain the growing population. The majority of residents in the OECS countries have not expanded their revenue stream to include other forms of income such as dividends. This is in part because the financial sector has not been

developed adequately, making the stock market an everyday event. In addition, like many developing countries, wages in the OECS countries are low. A labor supply that is growing faster than the creation of new jobs lowers the wage rate. Further, the OECS countries are also prone to higher levels of inflation than more industrialized countries. Unfortunately, wage increases are not at the same speed as the price level. This in part, explains the findings in the money supply.

Ordinarily, it can be theorized that a positive relationship between the price level and money supply serves to increase income, since employers would increase income to compensate for the rising prices of goods. The effect is an increase in per capita income. In the OECS, because population is growing faster than job creation, the impetus to move wages upwards is absent causing both the negative relationship seen in many of the equations between employment and per capita income, and more pronounced in the findings for M1 and INC.

Government expenditures play a major role in the standards of living and are reflected in the magnitude of the coefficients of equations. Government expenditures include grants from donor countries that are injected into the economy for a number of development projects. These projects include the building of new structures, the refurbishing of homes, and the creation of community parks and sidewalks, to name a few. This injection into the economy creates employment for residents in the OECS countries and is responsible for paying a substantial amount of salaries. However, the additional jobs created are insufficient to close the gap between population growth and employment growth, hence the large but negative relationship between EXP and INC.

It has been echoed repeatedly that the OECS countries depend, to a large extent on imports. It is no surprise that it quite possibly the main factor influencing standards of living in the region. Earlier we discussed that OECS countries are more likely to experience exchange rate pass through than developed countries. The argument is not much different here. Significant increases in the price of oil and other products used in production are responsible for much of the increase in inflation in the OECS. When prices rise too quickly, especially when income does not grow quickly enough to match inflation, it slows down business and other economic activity. This is reflected in the inverse relationship between IMP and per capita income. We can also tie this finding with the relationship between the money supply and per

capita income. As the money supply and the price level increase, income is unable to accommodate their increases because of the strength of the effect of rising import prices.

Finally, as identified throughout the results, some of the coefficients of the explanatory variables do not meet their expected signs. This is indicative of a number of possible issues. First, it is likely that the models used for all the OECS countries should not be standard. The idiosyncrasies in each country potentially make them vary sufficiently causing them each to require a different set of variables. Next, It is also possible that the commonalities that bond the countries together are strong enough that they should be examined as one group. Data for all the countries possibly could be grouped together and a panel vector error correction model estimated for the region. Thirdly, it is possible that the unexpected signs are an indication of specification error. This point is linked to the previous statement that each country may require their unique set of variables. Using the wrong combination of variables in the model is one source of specification error.

CHAPTER 7

APPLING THE FINDING IN THE OECS

7.1 Policy Recommendations

In the OECS, monetary policy should be treated similar to other economic indicators, as a means to improving standards of living. The analyses show that monetary policy is just as effective at improving standards of living as those other variables more frequently discussed in local economic development theory. The loose relationship identified in the interviews between the ECCB and the governments of the individual countries provides an initial indication of the influence of monetary policy at the local level. The empirical analysis support the suspicions found in the interviews. The vector error correction models demonstrate that monetary policy is just as important as government expenditures and import prices when seeking to improve the standards of living of residents in the OECS. Monetary policy formation was even found be more influential that employment. Other empirical approaches such as the Granger causality tests and the reaction functions confirm that monetary policy is an influential variable that needs consideration when attempting to improve standards of living in the OECS countries.

Recognition of the monetary policy as a tool for improving standards of living and treating it in this manner will enable the OECS countries to maximize the potential gains that can be derived from policy formation. By changing the way monetary policy is viewed also changes the way it is used. By developing new creative ways for monetary policy to permeate the local economy may result in new and unexpected benefits that have not been realized previously.

Recognition of monetary policy as a useful tool for impacting standards of living is just the beginning. The next steps involve the formulation of theory that articulates the conditions when monetary policy satisfies the requirement of being a local economic development tool, the different ways it can be used in the economy, and the benefits of considering monetary policy as a means towards improving standards of living, to name a few.

Past studies have noted that conventional theory does not always hold in developing countries. The analysis performed in this clearly shows that based on the nuances in the OECS region, and the idiosyncrasies in each specific country makes conventional theory even less applicable. The creation of a theory, specific to the conditions of countries like the OECS opens up the reality of this region to more widespread discussion. The result of this is the competition of ideas and more rapid growth in the applicability and benefits of monetary policy as a local economic development tool. In addition, a formal theory enables institutions, researchers, and so forth to be better able to analyze and track the impact of monetary policy.

An examination of the structure of the economy for each of the OECS countries show that despite their common history, the individual countries have moved in different paths economically. The empirical analysis supports this finding about the economies. The importance of the variables in both the price models and the development models vary. The direction of correlation between the explanatory variables and the dependent variables also vary by model. All of which is further supported by the reaction functions and the Granger causality tests. Despite the differences in the individual countries, monetary policy is formulated for the region as a whole, is identified in the summary of the interviews. It is recommended that while the ECCB continue to create similar policies for the region, there should be stylized differences incorporated in the policy recommendations for each country. The differences for each country should be extensive, but sufficient for the effect to be noticed. While the general policy decision addresses the regional concerns, the specific differences catered to each country will allow for a more direct effect on the peculiarities of each country.

The U.S. is the largest trading partner in the OECS region. This is acknowledged by the ECCB and local monetary policy formation incorporates the influence of U.S. monetary policy in the decision making process. Although not entirely, the policy formation process of the ECCB mitigates the effect of U.S. policy decisions in the region. However, inflation and standards of living in the OECS countries are still affected. This is because of the exchange rate pass through. The dependence on tradable comestibles internationally, combined with those from the U.S. plays a major role in the local economy. The ECCB should more actively address the impact of tradable input that originate outside of the U.S. as

a means to achieving price stability, and ultimately having a greater impact on standards of living in the OECS countries. High levels of inflation negatively affect the economic environment, resulting in business closures, among other things. By paying closer attention to import prices and the ERPT, monetary policy can help address the slowdown in the business environment, reducing the dependence on donor country related jobs mentioned earlier.

Finally, it is recommended that the ECCB continue most of what it is already doing. That includes working with the individual countries on the creation of monetary and fiscal policy. Both forms of policy creation are important in improving standards of living, despite they operate in different ways. Nonetheless, when monetary policy and fiscal policy work in tandem, it strengthens the country's ability to achieve their desired goals. This already existing approach to achieving price stability is in accordance with suggested techniques for addressing rising prices under an endogenous money supply scenario.

CHAPTER 8

SUMMARY AND WAY FORWARD

8.1 Conclusion

This study examines the impact of monetary policy in the Organization of Eastern Caribbean States (OECS). The institution responsible for crafting monetary policy in the OECS region is the Eastern Caribbean Central Bank (ECCB). Prior to delving into the objective of the study, the paper first examines the role and function of the ECCB in the region. The paper also details the structure of government that exists in the OECS countries. All the countries adhere to the Treaty of Basseterre, making their form of government identical. The initial look at the government structure set the basis for the argument that individually, the OECS economies can be viewed as local. If the OECS economies, individually, are at the local level, then monetary policy as a strategy becomes a strategy used to achieve local economic development goals. The intention here is to identify the ability of monetary policy to influence the local economic goal of improving standards of living.

Monetary policy has not been directly used as a strategy of local government to effect local economic development goals and as such identifying a model that fits this need is not readily available. In addition, the ability to use existing models found in local economic development is not directly applicable, because the majority of the models are created for more industrialized countries. The OECS region also varies tremendously from other developing countries making the few models applied to these countries of little use.

This study applies a research-then-theory approach to analyze the impact of monetary policy in the OECS. A combination of techniques, interviews, vector error correction models (VECM), reaction functions, and Granger causality tests, are used achieving the objective of the study. The interviews serve multiple purposes that include the identification of variables to be used in the empirical processes, an examination of the process of monetary policy creation by the ECCB, and analysis of monetary policy in

the OECS region. To analyze whether monetary policy impacts standards of living in the OECS countries, it is necessary to understand the issues surrounding monetary policy creation. These issues involve how the money supply operates in the economy, that is, endogenously or exogenously. To address both the issue of endogeneity of the money supply and the impact of monetary policy at the local level in the OECS, two models were created: a price model and a development model.

The VECM is a non-structured regression technique that can be utilized when the theory is unclear about how the model should be structured. Sixteen VECM are created, eight for the price model and eight for the development model. The reaction functions describe the response of one variable brought about by a unit change in another. The primary use of this the reaction functions are to help determine whether the money supply is an endogenous variable or not. The Granger causality tests triangulate the findings of the reaction functions. The Granger causality tests whether the action of one variable is preceded by that of another.

The findings indicate that the money supply is endogenous in the OECS. The analysis also shows that monetary policy is an important variable that should be used when the OECS governments are considering effecting standards of living. Other variables, such as government expenditure and import prices possess the lion share of the impact on per capita income, but monetary policy is not far behind. Employment that is one of the most discussed variables in local economic development theory has the least influence in the OECS. Further, despite the overall significance of the variables in the OECS economies, the degree of influence from one variable to the next varies by countries. This makes no one variable the most significant in all of the countries.

Based on the findings, the study puts forward a number of recommendations. These include OECS governments treating monetary policy as a local economic development strategy. Doing this will allow more creative ways to monetary policy to permeate the local economies. Also, The ECCB or other regional institution should consider putting forward a theory that outlines how monetary policy can be viewed as a local economic development tool and the benefits of the policy being dealt with from this perspective. Other recommendations include, paying closer attention to foreign inputs not originating from the U.S, and continuing to work with local governments to coordinate fiscal policy with monetary policy.

There are opportunities for future research. The OECS region share a common history of British rule, they are currently bonded together, being members of the Eastern Caribbean Central Union. A panel VECM should be estimated in the future, analyzing the region as a whole. Alternatively, despite their commonalities, each country has peculiarities that set them apart from one another. Separate models should be estimated for each country, with the explanatory variables selected specifically for each country, instead of one set of variables applied for each country.

APPENDIX A

TABLES AND FIGURES



Source: CIA World Factbook



Table A.1. Descriptive Data for Price Model

CPI M1 USM1 IR IMP Mean 4.611 3.345 7.206 1.424 18.56 Median 4.590 3.264 7.221 1.455 18.4' Std. Dev. 0.166 0.425 0.180 0.156 0.3' Antigua (52)	64 72 38
Mean 4.611 3.345 7.206 1.424 18.56 Median 4.590 3.264 7.221 1.455 18.4 Std. Dev. 0.166 0.425 0.180 0.156 0.33 Antigua (52)	64 72 38
Median 4.590 3.264 7.221 1.455 18.4 Std. Dev. 0.166 0.425 0.180 0.156 0.33 Antigua (52)	72 38
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Antigua (52) CPI M1 USM1 IR IMP Mean 0.555 6.101 7.223 1.385 19.90 Median 0.732 6.205 7.221 1.367 19.92 Std. Dev. 0.823 0.359 0.176 0.144 0.18	
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CPI M1 USM1 IR IMP Mean 0.555 6.101 7.223 1.385 19.90 Median 0.732 6.205 7.221 1.367 19.92 Std. Dev. 0.823 0.359 0.176 0.144 0.18 Dominica (112) Implementation Implementation Implementation Implementation	
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Median 0.732 6.205 7.221 1.367 19.92 Std. Dev. 0.823 0.359 0.176 0.144 0.18 Dominica (112)	03
Std. Dev. 0.823 0.359 0.176 0.144 0.18 Dominica (112)	23
Dominica (112)	88
	70
Median 4.478 4.370 6.977 1.409 18.5	12
Median 4.510 4.319 7.012 1.388 18.6 Std Dov 0.490 0.600 0.244 0.404 0.404	17
Sid. Dev. 0.186 0.608 0.314 0.194 0.18	90
Grenada (112)	
CPI M1 USM1 IR IMP	
Mean 4.457 4.937 6.977 1.418 19.09	57
Median 4.467 4.965 7.012 1.324 19.14	40
Std. Dev. 0.202 0.719 0.314 0.293 0.32	23
Montserrat (34)	
CPI M1 USM1 IR IMP	
Mean 4.183 2.961 6.755 1.326 18.75	55
Median 4.317 3.086 6.979 1.222 18.72	29
Std. Dev. 0.495 0.581 0.482 0.314 0.20	04
St. Kitts (112)	
CPI M1 USM1 IR IMP	
Mean 4.402 4.478 6.977 1.592 19.02	27
Median 4.425 4.413 7.012 1.515 19.0	52
Std. Dev. 0.259 0.809 0.314 0.208 0.28	85
St. Lucia (112)	
	_
Mean 4 403 5 472 6 977 1 506 19 3	73
Median 4 408 5 434 7 012 1 502 19 40	. J 01
Std. Dev. 0.238 0.746 0.314 0.331 0.37	38
St. Vincent (112)	
CPI M1 USM1 IR IMP	24
CPI M1 USM1 IR IMP Mean 4.462 4.861 6.977 1.414 18.92	
CPI M1 USM1 IR IMP Mean 4.462 4.861 6.977 1.414 18.92 Median 4.489 4.888 7.012 1.429 18.82	27

Anguilla (25)					
	INC	EMP	IMP	EXP	M1
Mean	10.044	8.943	19.513	18.582	16.753
Median	9.853	8.949	19.522	18.387	16.678
Std. Dev.	0.603	0.188	0.557	0.552	0.590
Antigua (38)					
	INC	EMP	IMP	EXP	M1
Mean	9.249	10.814	20.224	19.527	18.136
Median	9.374	10.744	20.335	19.422	18.232
Std. Dev.	0.393	0.132	0.411	0.707	1.002
Dominica (34)					
	INC	EMP	IMP	EXP	M1
Mean	8.293	10.341	19.135	18.312	17.254
Median	8.375	10.355	19.143	18.315	17.205
Std. Dev.	0.293	0.029	0.170	0.244	0.555
Grenada (38)					
	INC	EMP	IMP	EXP	M1
Mean	8.916	9.726	20.265	19.914	18.467
Median	9.021	9.804	20.255	20.029	18.364
Std. Dev.	0.438	0.391	0.402	0.569	0.748
Montserrat(34)					
	INC	EMP	IMP	EXP	M1
Mean	9.304	NA	18.755	18.027	16.777
Median	9.422	NA	18.729	18.068	16.901
Std. Dev.	0.604	NA	0.204	0.462	0.581
St. Kitts (38)					
	INC	EMP	IMP	EXP	M1
Mean	8.787	9.873	19.545	18.693	17.217
Median	8.857	9.873	19.576	18.887	17.255
Std. Dev.	0.555	0.041	0.324	0.491	0.740
St. Lucia (41)					
	INC	EMP	IMP	EXP	M1
Mean	9.014	10.760	20.612	19.352	18.656
Median	9.124	10.765	20.634	19.394	18.572
Std. Dev.	0.319	0.275	0.353	0.460	0.803
St. Vincent (38)					
	INC	EMP	IMP	EXP	M1
Mean	8.076	10.637	19.386	18.481	17.541
Median	8.139	10.669	19.365	18.398	17.324
Std. Dev.	0.463	0.177	0.408	0.530	0.941
L	•		•		

Table A.2 Descriptive Data for Development Model



Price Model Descriptive Charts





Figure A 1.2 Descriptive Charts Anguilla



Figure A.1.3 Descriptive Charts Anguilla



Figure A.1.4 Descriptive Charts Anguilla



Figure A.2.1 Descriptive Charts Antigua



Figure A.2.2 Descriptive Charts Antigua



Figure A.2.3 Descriptive Charts Antigua



Figure A.2.4 Descriptive Charts Antigua


Figure A.3.1 Descriptive Charts Dominica



Figure A.3.2 Descriptive Charts Dominica



Figure A.3.3 Descriptive Charts Dominica



Figure A.3.4 Descriptive Charts Dominica







Figure A.4.2 Descriptive Charts Grenada



Figure A.4.3 Descriptive Charts Grenada



Figure A.4.4 Descriptive Charts Grenada



Figure A.5.1 Descriptive Charts Montserrat



Figure A.5.2 Descriptive Charts Montserrat



Figure A.5.3 Descriptive Charts Montserrat



Figure A.5.4 Descriptive Charts Montserrat



Figure A.6.1 Descriptive Charts St. Kitts



Figure A.6.2 Descriptive Charts St. Kitts



Figure A.6.3 Descriptive Charts St. Kitts



Figure A.6.4 Descriptive Charts St. Kitts



Figure A.7.1 Descriptive Charts St. Lucia



Figure A.7.2 Descriptive Charts St. Lucia



Figure A.7.3 Descriptive Charts St. Lucia



Figure A.7.4 Descriptive Charts St. Lucia



Figure A.8.1 Descriptive Charts St. Vincent



Figure A.8.2 Descriptive Charts St. Vincent



Figure A.8.3 Descriptive Charts St. Vincent



Figure A.8.4 Descriptive Charts St. Vincent



Development Model Descriptive Charts

Figure A.9.1 Descriptive Charts Anguilla



Figure A.9.2 Descriptive Charts Anguilla



Figure A.9.3 Descriptive Charts Anguilla



Figure A.9.4 Descriptive Charts Anguilla



Figure A.10.1 Descriptive Charts Antigua



Figure A.10.2 Descriptive Charts Antigua



Figure A.10.3 Descriptive Charts Antigua



Figure A.10.4 Descriptive Charts Antigua



Figure A.11.1 Descriptive Charts Dominica



Figure A.11.2 Descriptive Charts Antigua



Figure A.11.3 Descriptive Charts Antigua







Figure A.12.1 Descriptive Charts Grenada



Figure A.12.2 Descriptive Charts Grenada



Figure A.12.3 Descriptive Charts Grenada



Figure A.12.4 Descriptive Charts Grenada



Figure A.13.1 Descriptive Charts Montserrat



Figure A.13.2 Descriptive Charts Montserrat



Figure A.13.3 Descriptive Charts Montserrat



Figure A.14.1 Descriptive Charts St. Kitts







Figure A.14.3 Descriptive Charts St. Kitts



Figure A.14.4 Descriptive Charts St. Kitts



Figure A.15.1 Descriptive Charts St. Lucia



Figure A.15.2 Descriptive Charts St. Lucia



Figure A.15.3 Descriptive Charts St. Lucia



Figure A.15.4 Descriptive Charts St. Lucia



Figure A.16.1 Descriptive Charts St. Vincent



Figure A.16.2 Descriptive Charts St. Vincent



Figure A.16.3 Descriptive Charts St. Vincent



Figure A.16.4 Descriptive Charts St. Vincent

Price Mode	el							
	M1	СРІ	USM1	СРІ	IR	СРІ	IMP	СРІ
Lag Length	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒
	СРІ	M1	СРІ	USM1	СРІ	IR	СРІ	IMP
1	0.517	9.226	1.552	0.029	0.172	0.247	2.433	0.587
	0.475	0.004	0.218	0.866	0.68	0.621	0.125	0.447
2	0.13	1.607	1.876	0.46	0.282	1.838	1.488	1.244
	0.878	0.211	0.164	0.628	0.756	0.17	0.236	0.297
3	0.226	0.547	1.511	0.628	0.218	1.186	1.984	0.949
	0.877	0.623	0.224	0.601	0.884	0.325	0.13	0.425
4	0.187	0.271	1.181	0.442	0.202	1.242	1.747	0.708
	0.944	0.895	0.333	0.777	0.936	0.308	0.157	0.591
5	1.253	1.444	1.96	0.317	0.393	1.005	1.843	1.041
	0.303	0.23	0.106	0.9	0.851	0.427	0.126	0.407
6	1.189	1.268	1.554	0.379	0.289	0.81	1.609	0.889
	0.334	0.296	0.188	0.888	0.928	0.569	0.172	0.513

Table A.3.1 Anguilla Causality Tests

Table A.3.2 Anguilla Causality Tests

Developme	ent Model							
	M1	GDP	EMP	GDP	INV	GDP	IMP	GDP
Lag Length	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒
	GDP	M1	GDP	ЕМР	GDP	INV	GDP	IMP
1	0.107	8.53	6.066	0.692	5.817	14.851	0.014	4.016
	0.747	0.008	0.023	0.415	0.025	0.001	0.907	0.058
2	0.31	3.865	6.026	1.315	2.571	8.631	0.005	3.314
	0.737	0.04	0.01	0.293	0.104	0.002	0.995	0.06
3	1.054	3.428	5.762	0.902	3.866	3.795	0.542	1.935
	0.398	0.045	0.008	0.463	0.031	0.033	0.661	0.167
4	0.628	2.093	3.848	0.472	2.375	3.562	1.961	2.516
	0.651	0.145	0.031	0.755	0.11	0.039	0.165	0.097
5	0.613	0.763	3.477	0.472	1.425	2.685	3.043	1.555
	0.694	0.599	0.05	0.789	0.303	0.094	0.07	0.266
6	0.177	0.563	3.177	1.451	1.497	1.303	3.098	0.708
	0.973	0.749	0.093	0.331	0.398	0.378	0.097	0.657

Price Mode	2l							
	M1	СРІ	USM1	СРІ	IR	СРІ	IMP	СРІ
Lag Length	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒
	СРІ	M1	СРІ	USM1	СРІ	IR	СРІ	IMP
1	0.944	0.04	2.132	4.925	0.775	0.033	0.335	0.965
	0.336	0.841	0.151	0.031	0.383	0.857	0.566	0.331
2	0.527	0.018	0.877	2.209	1.98	0.018	0.345	0.463
	0.594	0.983	0.423	0.122	0.15	0.982	0.71	0.633
					['			
3	0.601	0.117	1.549	1.342	1.452	0.252	0.255	0.324
	0.618	0.95	0.216	0.274	0.241	0.859	0.857	0.808
4	0.776	1.017	2.667	1.085	1.099	0.544	0.245	0.232
	0.548	0.411	0.046	0.377	0.371	0.705	0.911	0.919
					['			
5	0.406	1.04	1.709	0.897	0.585	0.395	0.512	0.323
	0.841	0.409	0.158	0.493	0.711	0.849	0.765	0.896
					['			
6	0.54	1.049	1.612	1.626	0.872	1.157	0.593	0.393
	0.774	0.412	0.175	0.171	0.525	0.353	0.734	0.878

Table A.4.1 Antigua Causality Tests

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I able A.	4.2 Antigua	a Causality	l ests

Developme	ent Model							
	M1	GDP	EMP	GDP	INV	GDP	IMP	GDP
Lag Length	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒
	GDP	M1	GDP	ЕМР	GDP	INV	GDP	IMP
1	0.017	5.193	0.356	10.325	0.009	3.209	3.80E-05	5.044
	0.897	0.029	0.555	0.003	0.925	0.082	0.005	0.031
2	0.234	2.2	0.826	2.603	0.189	2.038	0.224	5.221
	0.792	0.128	0.447	0.09	0.829	0.147	0.801	0.011
3	0.363	1.64	0.991	1.532	0.358	1.335	0.207	2.383
	0.78	0.203	0.412	0.228	0.784	0.283	0.891	0.091
4	0.397	0.859	0.286	3.951	0.558	2.501	0.488	2.067
	0.809	0.502	0.884	0.023	0.695	0.068	0.744	0.115
		<u> </u>						
5	0.426	0.825	0.465	3.158	0.338	1.701	0.606	0.971
	0.826	0.543	0.798	0.027	0.884	0.176	0.696	0.457
6	0.89	0.765	0.761	2.252	1.287	1.839	0.743	3.466
	0.522	0.606	0.609	0.082	0.31	0.145	0.622	0.017

Price Mode	el							
	M1	СРІ	USM1	СРІ	IR	CPI	IMP	СРІ
Lag Length	⇒	⇒	⇒	⇒	⇒	Ĥ	⇒	Ĥ
	СРІ	М1	СРІ	USM1	СРІ	IR	СРІ	IMP
1	9.789	18.854	0.643	0.72	0.003	17.786	1.694	2.479
	0.002	0	0.425	0.398	0.953	0	0.196	0.118
2	5.25	3.819	0.316	3.493	0.009	8.531	0.917	4.455
	0.007	0.025	0.73	0.034	0.991	0	0.403	0.014
3	3.834	2.232	0.136	3.954	0.802	4.212	1.111	3.442
	0.012	0.089	0.938	0.01	0.496	0.007	0.348	0.02
4	4.664	1.116	0.18	3.011	1.102	2.187	1.64	2.758
	0.002	0.354	0.948	0.022	0.36	0.076	0.17	0.032
5	2.709	1.259	0.419	2.572	1.004	2.178	1.362	3.752
	0.025	0.288	0.834	0.031	0.42	0.063	0.246	0.004
6	3.289	0.996	0.555	3.362	0.865	2.05	1.333	4.799
	0.006	0.433	0.765	0.005	0.524	0.067	0.251	0.000

Table A.5.1 Dominica Causality Tests

Table A.5.2	Dominica	Causality	/ Tests
1001071.0.2	Dominiou	Guusunty	10010

Developme	ent Model							
	M1	GDP	ЕМР	GDP	INV	GDP	IMP	GDP
Lag Length	Ĥ	⇒	⇒	Ĥ	⇒	⇒	⇒	⇒
	GDP	M1	GDP	ЕМР	GDP	INV	GDP	ІМР
1	0.733	2.061	0.013	0.904	1.65	0.794	0.941	3.959
	0.399	0.162	0.91	0.349	0.209	380	0.34	0.056
2	0.389	0.812	0.112	1.081	1.694	1.167	0.56	2.564
	0.682	0.455	0.895	0.353	0.203	0.327	0.577	0.096
3	0.902	0.671	0.056	1.218	1.018	2.504	0.925	1.988
	0.455	0.578	0.982	0.325	0.402	0.083	0.444	0.143
4	0.367	0.222	0.017	0.437	0.524	3.258	0.544	3.078
	0.829	0.923	0.999	0.781	0.719	0.032	0.705	0.038
5	0.219	0.412	0.694	0.482	0.249	3.184	0,769	2.355
	0.95	0.834	0.694	0.785	0.935	0.031	0.584	0.082
6	0.327	0.427	0.525	0.65	0.101	3.313	0.918	2.775
	0.971	0.849	0.78	0.69	0.995	0.028	0.502	0.051

Price Mode	əl							
	M1	СРІ	USM1	СРІ	IR	СРІ	ІМР	СРІ
Lag Length	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒
	СРІ	M1	СРІ	USM1	СРІ	IR	СРІ	IMP
1	0.207	51.863	0.061	5.941	0.176	5.887	0.117	2.207
	0.65	8.40E-11	0.806	0.016	0.675	0.017	0.734	0.14
2	. 3.629	0.807	1.818	4.949	0.63	2.672	0.345	2.248
	0.03	0.449	0.617	0.009	0.535	0.074	0.709	0.111
3	1.822	0.804	2.488	5.025	0.495	1.836	0.248	1.646
	0.148	0.495	0.065	0.003	0.686	0.145	0.863	0.183
4	1.226	2.722	1.869	4.455	0.344	1.698	0.243	1.193
	0.305	0.034	0.122	. 0.002	0.847	0.157	0.913	0.319
5	1.255	3.346	1.657	3.138	0.544	1.632	0.727	1.132
	0.29	0.008	0.153	0.011	0.743	0.159	0.605	0.349
6	0.957	2.428	1.648	3.164	0.628	1.593	0.68	1.207
	0.459	0.032	0.143	, 0.007	0.707	0.158	0.666	, 0.31

Table A.6.1 Grenada Causality Tests

		_ .		_
Table /	A.6.2	Grenada	Causality	Tests

Developme	nt Model							
	M1	GDP	ЕМР	GDP	INV	GDP	ІМР	GDP
Lag Length	ſſ	ſſ	ſſ	Ĥ	⇒	ſſ	ſſ	ſſ
	GDP	М1	GDP	ЕМР	GDP	INV	GDP	ІМР
1	0.141	7.966	0.311	0.884	7.502	12.212	0.407	3.324
	0.71	0.008	0.581	0.354	0.01	0.001	0.528	0.077
2	0.291	5.204	0.002	0.166	2.695	5.183	0.509	1.211
	0.749	0.011	0.998	0.848	0.083	0.011	0.606	1.312
3	0.309	2.897	1.564	0.753	1.217	1.211	0.098	0.51
	0.818	0.053	0.22	0.53	0.322	0.324	0.961	0.679
4	0.876	2.464	1.698	1.388	0.521	2.863	0.136	1.345
	0.492	0.071	0.182	0.267	0.721	0.044	0.968	0.281
5	1.183	2.129	1.058	0.522	0.616	2.251	0.68	1.991
	0.349	0.1	0.41	0.758	0.689	0.085	0.644	0.12
6	0.822	1.018	0.905	0.499	0.619	1.003	0.777	1.03
	0.567	0.443	0.512	0.802	0.713	0.452	0.598	0.436

Price Mode	el							
	M1	СРІ	USM1	СРІ	IR	СРІ	ІМР	СРІ
Lag Length	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒
	СРІ	M1	СРІ	USM1	СРІ	IR	СРІ	IMP
1	0.004	2.693	0.65	1.882	0.026	5.662	0.492	0.628
	0.948	0.111	0.427	0.18	0.873	0.024	0.488	0.434
2	0.029	3.043	4.733	4.998	0.129	2.364	0.132	0.428
	0.971	0.064	0.017	0.014	0.879	0.113	0.877	0.656
3	0.025	1.661	4.633	1.852	0.122	0.85	1.197	0.551
	0.995	0.202	0.011	0.165	0.946	0.84	0.332	0.652
4	0.034	1.589	3.186	1.899	0.093	0.585	1.042	1.36
	0.998	0.214	0.034	0.148	0.984	0.677	0.409	0.282
5	0.127	1.034	1.646	2.667	0.107	0.405	1.249	1.39
	0.984	0.428	0.199	0.104	0.989	0.439	0.938	0.27
6	0.62	0.878	1.052	1.699	0.379	0.247	2.441	2.314
	0.712	0.534	0.432	0.189	0.881	0.953	0.074	0.088

Table A 7 2 Montserrat Ca	usality Tests
	lusality resis

Developme	ent Model					
	M1	GDP	INV	GDP	IMP	GDP
Lag Length	⇒	⇒	⇒	⇒	⇒	⇒
	GDP	M1	GDP	INV	GDP	ІМР
1	0.421	0.505	3.692	2.438	3.765	0.005
	0.522	0.483	0.064	0.129	0.062	0.942
2	1.416	0.591	1.958	0.624	2.532	2.669
	0.26	0.561	0.161	0.544	0.098	0.088
3	2.15	0.266	1.363	1.012	1.941	1.628
	0.12	0.849	0.278	0.405	0.15	0.209
4	1.717	0.494	1.133	0.523	2.51	1.711
	0.184	0.74	0.368	0.72	0.073	0.185
5	1.667	0.169	1.231	0.469	1.796	1.195
	0.194	0.971	0.335	0.794	0.173	0.351
6	1.34	0.202	1.295	0.86	1.604	1.367
	0.3	0.971	0.318	0.545	0.214	0.29

Price Mode	əl							
	M1	СРІ	USM1	СРІ	IR	СРІ	ІМР	СРІ
Lag Length	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒
	СРІ	M1	CPI	USM1	СРІ	IR	СРІ	IMP
1	4.215	58.853	0.223	4.249	0.2	1.227	0.538	0.742
	0.042	8.00E-12	0.638	0.042	0.656	0.27	0.465	0.391
2	. 2.822	2.131	6.013	2.615	0.091	0.661	0.424	0.732
	0.064	0.124	0.003	0.078	0.913	0.518	0.655	0.484
3	, 2.722	2.662	4.323	2.357	1.719	0.503	0.379	0.6
	0.048	0.052	0.007	0.076	0.168	0.681	0.769	0.617
4	1.925	2.225	3.2	1.787	1.378	0.458	0.577	0.956
	0.112	0.072	0.016	0.137	0.247	0.767	0.68	0.435
5	1.662	1.759	3.53	1.112	1.553	0.601	0.747	0.205
	0.151	0.129	0.006	0.359	0.181	0.699	0.59	0.313
6	1.4	1.413	3.054	1.149	1.513	0.639	0.597	0.976
1	0.223	0.218	0.009	0.341	0.192	0.699	0.732	0.446

Table A.8.1 St. Kitts and Nevis Causality Tests

Table A.8.2 St.	Kitts and Nevis	Causality Tests

Developme	ent Model							
	M1	GDP	ЕМР	GDP	INV	GDP	IMP	GDP
Lag Length	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒
	GDP	M1	GDP	ЕМР	GDP	INV	GDP	IMP
1	3.411	0.051	1.952	12.389	2.894	8.937	0.558	0.226
	0.073	0.823	0.171	0.001	0.098	0.005	0.46	0.145
2	1.538	0.551	0.648	3.227	2.538	6.245	0.257	1.434
	0.231	0.582	0.53	0.053	0.095	0.005	0.775	0.254
3	0.722	0.473	0.108	4.233	1.898	3.292	0.416	1.433
	0.547	0.752	0.955	0.014	0.153	0.035	0.743	0.254
4	0.61	0.617	0.262	1.785	2.318	4.065	0.816	1.092
	0.659	0.655	0.899	0.163	0.085	0.011	0.527	0.382
5	1.282	1.442	0.179	0.861	2.539	2.413	0.602	0.801
	0.387	0.249	0.968	0.523	0.059	0.069	0.699	0.561
6	1.037	0.962	0.781	1.272	2.262	1.773	1.99	0.664
	0.423	0.476	0.595	0.316	0.081	0.159	0.118	0.68

Price Mode	el 🛛							
	M1	СРІ	USM1	СРІ	IR	СРІ	IMP	СРІ
Lag Length	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒
	СРІ	M1	СРІ	USM1	СРІ	IR	СРІ	IMP
1	6.262	27.018	0.444	0.155	1.246	6.21	3.979	3.272
	0.014	9.60E-07	0.507	0.694	0.267	0.014	0.049	0.073
2	5.95	0.986	0.699	2.207	0.509	3.562	1.813	2.449
	0.004	0.377	0.499	0.115	0.603	0.032	0.168	0.091
3	3.726	0.752	0.592	2.319	0.431	1.57	2.777	1.682
	0.014	0.524	0.622	0.08	0.731	0.201	0.045	0.176
4	3.294	0.61	0.224	2.514	0.289	1.146	2.854	1.263
	0.014	0.657	0.925	0.046	0.885	0.339	0.028	0.29
5	4.292	0.44	0.207	2.162	0.216	0.676	2.289	0.838
	0.001	0.82	0.959	0.065	0.955	0.643	0.052	0.526
6	2.934	1.045	0.177	1.997	0.162	0.697	1.733	1.203
	0.011	0.401	0.982	0.774	0.986	0.653	0.122	0.312

Table A.9.1 St. Lucia Causality Tests

Developme	ent Model							
	M1	GDP	ЕМР	GDP	INV	GDP	IMP	GDP
Lag Length	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒
	GDP	M1	GDP	EMP	GDP	INV	GDP	IMP
1	0.019	2.553	2.117	3.891	5.15	11.586	5.649	0.802
	0.891	0.119	0.154	0.056	0.029	0.002	0.023	0.396
2	0.22	3000	2.907	1.69	2.691	5.742	3.106	1.691
	0.804	0.063	0.068	0.2	0.082	0.007	0.058	0.199
3	0.901	2.045	2.845	1.383	1.491	5.722	2.751	1.859
	0.452	0.128	0.054	0.266	0.236	0.003	0.059	0.157
4	1.146	2.839	3.077	0.877	0.809	4.099	1.344	1.783
	0.356	0.043	0.032	0.49	0.53	0.01	0.079	0.16
5	1.184	1.654	2.736	1.018	0.516	1.737	1.84	1.885
	0.435	0.183	0.042	0.428	0.762	0.163	0.141	0.133
6	1.392	1.229	2.448	1.228	0.414	1.109	1.731	1.473
	0.262	0.329	0.058	0.33	0.862	0.389	0.161	0.233

Price Mode	el							
	M1	СРІ	USM1	СРІ	IR	СРІ	IMP	СРІ
Lag Length	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒
	СРІ	M1	СРІ	USM1	СРІ	IR	СРІ	ІМР
1	2.259	13.201	0.064	6.25	7.216	1.832	12.455	1.446
	0.136	0	0.801	0.014	0.008	0.179	0	0.232
2	1.061	0.326	0.686	4.211	4.564	1.013	3.296	0.663
	0.35	0.722	0.506	0.017	0.013	0.367	0.006	0.517
3	1.131	0.272	0.655	3.944	3.781	0.63	3.836	0.601
	0.34	0.845	0.582	0.01	0.013	0.598	0.012	0.616
4	0.63	0.675	0.146	3.285	3.167	0.372	3.26	0.453
	0.642	0.611	0.339	0.014	0.017	0.828	0.015	0.77
5	0.816	0.621	0.82	2.836	1.902	0.388	2.48	0.63
	0.541	0.684	0.538	0.02	0.101	0.856	0.037	0.678
	1							
6	0.728	0.428	0.89	2.873	1.72	0.264	1.998	1.019
	0.628	0.859	0.506	0.013	0.125	0.952	0.074	0.418

Table A.10.1 St. Vincent Causality Tests

Table A.10.2

Developme	ent Model							
	М1	GDP	EMP	GDP	INV	GDP	IMP	GDP
Lag Length	⇒	⇒	⇒	⇒	⇒	⇒	⇒	⇒
	GDP	M1	GDP	ЕМР	GDP	INV	GDP	IMP
1	0.725	2.048	0.262	1.757	0.297	8.74	0.129	7.018
	0.4	0.162	0.612	0.194	0.589	0.006	0.722	0.012
2	0.957	2.016	0.4	2.782	0.879	4.684	1.339	7.76
	0.395	0.15	0.674	0.077	0.425	0.017	0.277	0.002
3	1.471	2.173	0.717	3.245	1.042	1.76	1.203	6.86
	0.244	0.114	0.55	0.037	0.389	0.178	0.0327	0.001
4	0.857	3.088	0.347	2.778	0.866	0.982	1.128	3.817
	0.503	0.034	0.843	0.049	0.498	0.435	0.366	0.015
5	0.709	2.664	0.357	2.893	0.426	0.514	0.536	1.273
	0.623	0.05	0.873	0.037	0.826	0.763	0.747	0.311
6	2.01	2.793	0.361	3.451	0.51	1.043	0.52	0.849
	0.115	0.04	0.895	0.018	0.794	0.429	0.786	0.549

	Angı	uilla	Ant	igua	Dom	inica	Grei	nada	Mont	serrat	St.	Kitts	St. L	ucia	St. Vi	ncent
1st Diff	1st Diff	2nd Diff	1st Diff	2nd Diff	1st Diff	2nd Diff	1st Diff	2nd Diff	1st Diff	2nd Diff	1st Diff	2nd Diff	1st Diff	2nd Diff	1st Diff	2nd Diff
1% Critical Value	-4.1498	-3.5625	-4.1678	-3.5745	-4.0468	-3.4922	-4.0468	-3.4922	-4.3226	-4.3082	-4.0468	-4.046	-4.0468	-4.046	-4.0468	-4.046
5% Critical Value	-3.5005	-2.919	-3.5088	-2.9241	-3.4523	-2.8884	-3.4523	-2.8884	-3.5796	-3.5731	-3.4523	-3.4519	-3.4523	-3.4519	-3.4523	-3.4519
10% Critical Value	-3.1793	-2.597	-3.184	-2.5997	-3.1514	-2.5809	-3.1514	-2.5809	-3.2239	-3.2203	-3.1514	-3.1512	-3.1514	-3.1512	-3.1514	-3.1512
ADF Test Statistic : CPI	-3.20325	-6.3736	-5.19416		-4.44747		-4.74867		-2.15528	-5.79862	-4.14657		-5.1437		-3.69695	
ADF Test Statistic : M1	-2.54693	-9.4699	-1.46137	-14.0335	-5.28001		-5.11078		-3.72574		-4.46066		-3.52481			
ADF Test Statistic USM1	-2.50458	-4.9336	-2.36546	-4.61781	-2.25041	-6.89176	-2.25041	-6.89176	-2.06015	-4.70547	-2.25041	-6.93556	-2.25041	-6.93556	-2.25041	-6.93556
ADF Test Statistic : IR	-3.52684		-3.75129		-6.02135		-6.15072		-3.74473		-5.14549		-6.17367		-2.15528	-5.82052
ADF Test Statistic : IMP	-3.07855	-6.7227	-2.73872	-7.24861	-5.24278		-5.00452		-2.25194	-6.14437	-5.12277		-5.17371		-4.17507	

Table A.11.1 Unit Root Tests for Price Model Data

	Angu	uilla	Anti	gua	Domi	nica	Gren	ada	Mont	serrat	St. I	Kitts	St. L	ucia	St. Vi	ncent
1st Diff	1st Diff	2nd Diff	1st Diff	2nd Diff	1st Diff	2nd Diff	1st Diff	2nd Diff	1st Diff	2nd Diff	1st Diff	2nd Diff	1st Diff	2nd Diff	1st Diff	2nd Diff
1% Critical Value	-4.5348		-4.2712		-4.3226		-4.2712		-4.3226		-4.2712		-4.2412		-4.2712	
5% Critical Value	-3.6746		-3.5562		-3.5796		-3.5562		-3.5796		-3.5562		-3.5426		-3.5562	
10% Critical Value	-3.2762		-3.2109		-3.2239		-3.2109		-3.2239		-3.2109		-3.2032		-3.2109	
ADF Test Statistic : INC	-2.754	-4.0726	-3.74669		-2.78981	-4.7206	-3.4196	-5.0668	-3.10747	-5.35962	-3.145	-4.79216	`-4.16895 ⁻	7	-2.8577	-3.6725
ADF Test Statistic : M1	-2.0335	-3.6942	-2.58048	-4.9201	-2.68966	-5.8035	-2.83607	-6.2352	-3.72574		-2.65	-6.8186	-2.74557	-5.90705	-2.6018	-6.92747
ADF Test Statistic EMP	-2.7452	-4.9799	-1.63965	-3.9609	-1.74669	-5.5786	-3.88892		NA	NA	-3.0604	-3.84214	-2.97769	-6.45106	-3.59321	
ADF Test Statistic : EXP	-3.4628	-4.2738	-4.93194		-3.67668		-5.97477		-3.0135	-6.33896	-3.515	-4.79777	-5.1871		-3.71614	
ADF Test Statistic : IMP	-4.6816		-3.6553		-4.94726		-3.88776		-2.25194	-6.16064	-3.1931	-5.69245	-3.26341	-4.91059	-3.39668	-5.30152

Table A.11.2 Unit Root Tests for Development Model Data

Anguilla				
/ ingenie	Likelihood	5 Percent	1 Percent	Hypothesized
Figenvalue	Ratio	Critical Value	Critical Value	No. of CE(s)
Ligenvalue	rtatio	ontical value	ondear value	140. 01 02(3)
0.507	100 204	97 210	06 590	Nono **
0.307	65.071	62.000	70.050	At most 1 *
0.404	20.197	62.990	10.050	At most 1
0.291	39.107	42.440	40.450	At most 2
Antigua				
	Likelihood	5 Percent	1 Percent	Hypothesized
Eigenvalue	Ratio	Critical Value	Critical Value	No. of CE(s)
0.674	103.309	87.310	96.580	None **
0.406	51.712	62.990	70.050	At most 1
0.316	27.773	42,440	48,450	At most 2
Dominica				
Dominica	Likelihood	5 Dereent	1 Decemt	Hupotheoized
Circumsters.	Likelinood	5 Percent	T Percent	Hypothesized
Eigenvalue	Ratio	Critical value	Critical value	IND. OF CE(S)
0.000	441.045	07.010	00.500	N ++
0.363	111.915	87.310	96.580	None **
0.205	29.761	25.320	30.450	At most *
0.051	5.506	12.250	16.260	At most 2
Grenada				
	Likelihood	5 Percent	1 Percent	Hypothesized
Figenvalue	Ratio	Critical Value	Critical Value	No. of CE(s)
Ligentalao	- tatio	ondoar value	ondoar value	110. 01 02(0)
0.209	102.069	97 210	96 590	Nono **
0.350	22.000	07.310	30.300	At most 1
0.164	23.956	25.320	30.450	At most 1
0.045	4.925	12.250	16.260	At most 2
Montserrat				
Montserrat	Likelihood	5 Percent	1 Percent	Hypothesized
Montserrat Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
Montserrat Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
Montserrat Eigenvalue 0.869	Likelihood Ratio 126.508	5 Percent Critical Value 87.310	1 Percent Critical Value 96.580	Hypothesized No. of CE(s) None **
Montserrat Eigenvalue 0.869 0.565	Likelihood Ratio 126.508 65.463	5 Percent Critical Value 87.310 62.990	1 Percent Critical Value 96.580 70.050	Hypothesized No. of CE(s) None ** At most 1 *
Montserrat Eigenvalue 0.869 0.565 0.495	Likelihood Ratio 126.508 65.463 40.493	5 Percent Critical Value 87.310 62.990 42.440	1 Percent Critical Value 96.580 70.050 48.450	Hypothesized No. of CE(s) None ** At most 1 * At most 2
Montserrat Eigenvalue 0.869 0.565 0.495	Likelihood Ratio 126.508 65.463 40.493	5 Percent Critical Value 87.310 62.990 42.440	1 Percent Critical Value 96.580 70.050 48.450	Hypothesized No. of CE(s) None ** At most 1 * At most 2
Montserrat Eigenvalue 0.869 0.565 0.495 St Kitts	Likelihood Ratio 126.508 65.463 40.493	5 Percent Critical Value 87.310 62.990 42.440	1 Percent Critical Value 96.580 70.050 48.450	Hypothesized No. of CE(s) None ** At most 1 * At most 2
Montserrat Eigenvalue 0.869 0.565 0.495 St. Kitts	Likelihood Ratio 126.508 65.463 40.493	5 Percent Critical Value 87.310 62.990 42.440	1 Percent Critical Value 96.580 70.050 48.450	Hypothesized No. of CE(s) None ** At most 1 * At most 2
Montserrat Eigenvalue 0.869 0.565 0.495 St. Kitts	Likelihood Ratio 126.508 65.463 40.493 Likelihood	5 Percent Critical Value 87.310 62.990 42.440 5 Percent	1 Percent Critical Value 96.580 70.050 48.450	Hypothesized No. of CE(s) None ** At most 1 * At most 2 Hypothesized
Montserrat Eigenvalue 0.869 0.565 0.495 St. Kitts Eigenvalue	Likelihood Ratio 126.508 65.463 40.493 Likelihood Ratio	5 Percent Critical Value 87.310 62.990 42.440 5 Percent Critical Value	1 Percent Critical Value 96.580 70.050 48.450 1 Percent Critical Value	Hypothesized No. of CE(s) None ** At most 1 * At most 2 Hypothesized No. of CE(s)
Montserrat Eigenvalue 0.869 0.565 0.495 St. Kitts Eigenvalue	Likelihood Ratio 126.508 65.463 40.493 Likelihood Ratio	5 Percent Critical Value 87.310 62.990 42.440 5 Percent Critical Value	1 Percent Critical Value 96.580 70.050 48.450 1 Percent Critical Value	Hypothesized No. of CE(s) None ** At most 1 * At most 2 Hypothesized No. of CE(s)
Montserrat Eigenvalue 0.869 0.565 0.495 St. Kitts Eigenvalue 0.423	Likelihood Ratio 126.508 65.463 40.493 Likelihood Ratio	5 Percent Critical Value 87.310 62.990 42.440 5 Percent Critical Value 87.310	1 Percent Critical Value 96.580 70.050 48.450 1 Percent Critical Value 96.580	Hypothesized No. of CE(s) None ** At most 1 * At most 2 Hypothesized No. of CE(s)
Montserrat Eigenvalue 0.869 0.565 0.495 St. Kitts Eigenvalue 0.423 0.154	Likelihood Ratio 126.508 65.463 40.493 Likelihood Ratio 106.423 22.450	5 Percent Critical Value 87.310 62.990 42.440 5 Percent Critical Value 87.310 25.320	1 Percent Critical Value 96.580 70.050 48.450 1 Percent Critical Value 96.580 30.450	Hypothesized No. of CE(s) None ** At most 1 * At most 2 Hypothesized No. of CE(s) None ** At most 1
Montserrat Eigenvalue 0.869 0.565 0.495 St. Kitts Eigenvalue 0.423 0.154 0.044	Likelihood Ratio 126.508 65.463 40.493 Likelihood Ratio 106.423 22.450 4.725	5 Percent Critical Value 87.310 62.990 42.440 5 Percent Critical Value 87.310 25.320 12.250	1 Percent Critical Value 96.580 70.050 48.450 1 Percent Critical Value 96.580 30.450 16.260	Hypothesized No. of CE(s) None ** At most 1 * At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 1 At most 2
Montserrat Eigenvalue 0.869 0.565 0.495 St. Kitts Eigenvalue 0.423 0.154 0.044	Likelihood Ratio 126.508 65.463 40.493 Likelihood Ratio 106.423 22.450 4.725	5 Percent Critical Value 87.310 62.990 42.440 5 Percent Critical Value 87.310 25.320 12.250	1 Percent Critical Value 96.580 70.050 48.450 1 Percent Critical Value 96.580 30.450 16.260	Hypothesized No. of CE(s) None ** At most 1 * At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2
Montserrat Eigenvalue 0.869 0.565 0.495 St. Kitts Eigenvalue 0.423 0.154 0.044 St. Lucia	Likelihood Ratio 126.508 65.463 40.493 Likelihood Ratio 106.423 22.450 4.725	5 Percent Critical Value 87.310 62.990 42.440 5 Percent Critical Value 87.310 25.320 12.250	1 Percent Critical Value 96.580 70.050 48.450 1 Percent Critical Value 96.580 30.450 16.260	Hypothesized No. of CE(s) None ** At most 1 * At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2
Montserrat Eigenvalue 0.869 0.565 0.495 St. Kitts Eigenvalue 0.423 0.154 0.044 St. Lucia	Likelihood Ratio 126.508 65.463 40.493 Likelihood Ratio 106.423 22.450 4.725 Likelihood	5 Percent Critical Value 87.310 62.990 42.440 5 Percent Critical Value 87.310 25.320 12.250 5 Percent	1 Percent Critical Value 96.580 70.050 48.450 1 Percent Critical Value 96.580 30.450 16.260	Hypothesized No. of CE(s) None ** At most 1 * At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized
Montserrat Eigenvalue 0.869 0.565 0.495 St. Kitts Eigenvalue 0.423 0.154 0.044 St. Lucia Eigenvalue	Likelihood Ratio 126.508 65.463 40.493 Likelihood Ratio 106.423 22.450 4.725 Likelihood Ratio	5 Percent Critical Value 87.310 62.990 42.440 5 Percent Critical Value 87.310 25.320 12.250 5 Percent Critical Value	1 Percent Critical Value 96.580 70.050 48.450 1 Percent Critical Value 96.580 30.450 16.260	Hypothesized No. of CE(s) None ** At most 1 * At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s)
Montserrat Eigenvalue 0.869 0.565 0.495 St. Kitts Eigenvalue 0.423 0.154 0.044 St. Lucia Eigenvalue	Likelihood Ratio 126.508 65.463 40.493 Likelihood Ratio 106.423 22.450 4.725 Likelihood Ratio	5 Percent Critical Value 87.310 62.990 42.440 5 Percent Critical Value 87.310 25.320 12.250 5 Percent Critical Value	1 Percent Critical Value 96.580 70.050 48.450 1 Percent Critical Value 96.580 30.450 16.260 1 Percent Critical Value	Hypothesized No. of CE(s) None ** At most 1 * At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s)
Montserrat Eigenvalue 0.869 0.565 0.495 St. Kitts Eigenvalue 0.423 0.154 0.044 St. Lucia Eigenvalue 0.498	Likelihood Ratio 126.508 65.463 40.493 Likelihood Ratio 106.423 22.450 4.725 Likelihood Ratio 158.938	5 Percent Critical Value 87.310 62.990 42.440 5 Percent Critical Value 87.310 25.320 12.250 5 Percent Critical Value 87.310	1 Percent Critical Value 96.580 70.050 48.450 1 Percent Critical Value 96.580 30.450 16.260 1 Percent Critical Value 96.580	Hypothesized No. of CE(s) None ** At most 1 * At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None **
Montserrat Eigenvalue 0.869 0.565 0.495 St. Kitts Eigenvalue 0.423 0.154 0.044 St. Lucia Eigenvalue 0.498 0.197	Likelihood Ratio 126.508 65.463 40.493 Likelihood Ratio 106.423 22.450 4.725 Likelihood Ratio 158.938 45 247	5 Percent Critical Value 87.310 62.990 42.440 5 Percent Critical Value 87.310 25.320 12.250 5 Percent Critical Value 87.310 42.440	1 Percent Critical Value 96.580 70.050 48.450 1 Percent Critical Value 96.580 30.450 16.260 1 Percent Critical Value 96.580 48.450	Hypothesized No. of CE(s) None ** At most 1 * At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None **
Montserrat Eigenvalue 0.869 0.565 0.495 St. Kitts Eigenvalue 0.423 0.154 0.044 St. Lucia Eigenvalue 0.498 0.190	Likelihood Ratio 126.508 65.463 40.493 Likelihood Ratio 106.423 22.450 4.725 Likelihood Ratio 158.938 45.247 22.021	5 Percent Critical Value 87.310 62.990 42.440 5 Percent Critical Value 87.310 25.320 12.250 5 Percent Critical Value 87.310 25.320 12.250	1 Percent Critical Value 96.580 70.050 48.450 1 Percent Critical Value 96.580 30.450 16.260 1 Percent Critical Value 96.580 30.450 20.450 30.450	Hypothesized No. of CE(s) None ** At most 1 * At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 *
Montserrat Eigenvalue 0.869 0.565 0.495 St. Kitts Eigenvalue 0.423 0.154 0.044 St. Lucia Eigenvalue 0.498 0.197 0.139	Likelihood Ratio 126.508 65.463 40.493 Likelihood Ratio 106.423 22.450 4.725 Likelihood Ratio 158.938 45.247 22.021	5 Percent Critical Value 87.310 62.990 42.440 5 Percent Critical Value 87.310 25.320 12.250 5 Percent Critical Value 87.310 42.440 25.320	1 Percent Critical Value 96.580 70.050 48.450 1 Percent Critical Value 96.580 30.450 16.260 1 Percent Critical Value 96.580 48.450 30.450	Hypothesized No. of CE(s) None ** At most 1 * At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 * At most 1 * At most 1 *
Montserrat Eigenvalue 0.869 0.565 0.495 St. Kitts Eigenvalue 0.423 0.154 0.044 St. Lucia Eigenvalue 0.498 0.197 0.139	Likelihood Ratio 126.508 65.463 40.493 Likelihood Ratio 106.423 22.450 4.725 Likelihood Ratio 158.938 45.247 22.021	5 Percent Critical Value 87.310 62.990 42.440 5 Percent Critical Value 87.310 25.320 12.250 5 Percent Critical Value 87.310 42.440 25.320	1 Percent Critical Value 96.580 70.050 48.450 1 Percent Critical Value 96.580 30.450 16.260 1 Percent Critical Value 96.580 48.450 30.450	Hypothesized No. of CE(s) None ** At most 1 * At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 * At most 1 * At most 1 *
Montserrat Eigenvalue 0.869 0.565 0.495 St. Kitts Eigenvalue 0.423 0.154 0.044 St. Lucia Eigenvalue 0.498 0.197 0.139 St. Vincent	Likelihood Ratio 126.508 65.463 40.493 Likelihood Ratio 106.423 22.450 4.725 Likelihood Ratio 158.938 45.247 22.021	5 Percent Critical Value 87.310 62.990 42.440 5 Percent Critical Value 87.310 25.320 12.250 5 Percent Critical Value 87.310 42.440 25.320	1 Percent Critical Value 96.580 70.050 48.450 1 Percent Critical Value 96.580 30.450 16.260 1 Percent Critical Value 96.580 48.450 30.450	Hypothesized No. of CE(s) None ** At most 1 * At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 * At most 1 *
Montserrat Eigenvalue 0.869 0.565 0.495 St. Kitts Eigenvalue 0.423 0.154 0.044 St. Lucia Eigenvalue 0.498 0.197 0.139 St. Vincent	Likelihood Ratio 126.508 65.463 40.493 Likelihood Ratio 106.423 22.450 4.725 Likelihood Ratio 158.938 45.247 22.021 Likelihood	5 Percent Critical Value 87.310 62.990 42.440 5 Percent Critical Value 87.310 25.320 12.250 5 Percent Critical Value 87.310 42.440 25.320	1 Percent Critical Value 96.580 70.050 48.450 1 Percent Critical Value 96.580 30.450 16.260 1 Percent Critical Value 96.580 48.450 30.450	Hypothesized No. of CE(s) None ** At most 1 * At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 * At most 1 * At most 1 *
Montserrat Eigenvalue 0.869 0.565 0.495 St. Kitts Eigenvalue 0.423 0.154 0.044 St. Lucia Eigenvalue 0.498 0.197 0.139 St. Vincent Eigenvalue	Likelihood Ratio 126.508 65.463 40.493 Likelihood Ratio 106.423 22.450 4.725 Likelihood Ratio 158.938 45.247 22.021 Likelihood Ratio	5 Percent Critical Value 87.310 62.990 42.440 5 Percent Critical Value 87.310 25.320 12.250 5 Percent Critical Value 87.310 42.440 25.320 5 Percent Critical Value	1 Percent Critical Value 96.580 70.050 48.450 1 Percent Critical Value 96.580 30.450 16.260 1 Percent Critical Value 96.580 48.450 30.450	Hypothesized No. of CE(s) None ** At most 1 * At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 * At most 1 * At most 2 Hypothesized No. of CE(s)
Montserrat Eigenvalue 0.869 0.565 0.495 St. Kitts Eigenvalue 0.423 0.154 0.044 St. Lucia Eigenvalue 0.498 0.197 0.139 St. Vincent Eigenvalue	Likelihood Ratio 126.508 65.463 40.493 Likelihood Ratio 106.423 22.450 4.725 Likelihood Ratio 158.938 45.247 22.021 Likelihood Ratio	5 Percent Critical Value 87.310 62.990 42.440 5 Percent Critical Value 87.310 25.320 12.250 5 Percent Critical Value 87.310 42.440 25.320 5 Percent Critical Value	1 Percent Critical Value 96.580 70.050 48.450 1 Percent Critical Value 96.580 30.450 16.260 1 Percent Critical Value 96.580 48.450 30.450 1 Percent Critical Value	Hypothesized No. of CE(s) None ** At most 1 * At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 * At most 1 * At most 2 Hypothesized No. of CE(s)
Montserrat Eigenvalue 0.869 0.565 0.495 St. Kitts Eigenvalue 0.423 0.154 0.044 St. Lucia Eigenvalue 0.498 0.197 0.139 St. Vincent Eigenvalue 0.264	Likelihood Ratio 126.508 65.463 40.493 Likelihood Ratio 106.423 22.450 4.725 Likelihood Ratio 158.938 45.247 22.021 Likelihood Ratio Ratio 88.827	5 Percent Critical Value 87.310 62.990 42.440 5 Percent Critical Value 87.310 25.320 12.250 5 Percent Critical Value 87.310 42.440 25.320 5 Percent Critical Value 87.310	1 Percent Critical Value 96.580 70.050 48.450 1 Percent Critical Value 96.580 30.450 16.260 1 Percent Critical Value 96.580 48.450 30.450 1 Percent Critical Value 96.580	Hypothesized No. of CE(s) None ** At most 1 * At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 * At most 2 Hypothesized No. of CE(s) None *
Montserrat Eigenvalue 0.869 0.565 0.495 St. Kitts Eigenvalue 0.423 0.154 0.044 St. Lucia Eigenvalue 0.498 0.197 0.139 St. Vincent Eigenvalue 0.264 0.208	Likelihood Ratio 126.508 65.463 40.493 Likelihood Ratio 106.423 22.450 4.725 Likelihood Ratio 158.938 45.247 22.021 Likelihood Ratio 88.827 56.303	5 Percent Critical Value 87.310 62.990 42.440 5 Percent Critical Value 87.310 25.320 12.250 5 Percent Critical Value 87.310 42.440 25.320 5 Percent Critical Value 87.310 62.990	1 Percent Critical Value 96.580 70.050 48.450 1 Percent Critical Value 96.580 30.450 16.260 1 Percent Critical Value 96.580 48.450 30.450 1 Percent Critical Value 96.580 70.050	Hypothesized No. of CE(s) None ** At most 1 * At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 * At most 1 * At most 2 Hypothesized No. of CE(s)

Table A.12.1 Cointegration Tests Price Data

Anguilla					
Anguna		Likelihood	5 Percent	1 Percent	Hypothesized
Figopyoluo		Datio	Critical Value	Critical Value	No. of CE(c)
Eigenvalue	0.017	Ratio	Critical Value		No. of CE(S)
	0.917	140.342	07.310	90.000	None
	0.699	47.137	42.440	48.450	At most 1"
	0.542	20.748	25.320	30.450	At most 2
Antigua					
		Likelihood	5 Percent	1 Percent	Hypothesized
Eigenvalue		Ratio	Critical Value	Critical Value	No. of CE(s)
	0.762	98.552	87.310	96.580	None **
	0.472	51.234	62.990	70.050	At most 1
	0.444	30.135	42.440	48.450	At most 2
Dominica					
		Likelihood	5 Percent	1 Percent	Hypothesized
Eigenvalue		Ratio	Critical Value	Critical Value	No. of CE(s)
	0.931	156.327	87.310	96.580	None **
	0.456	34.393	42.440	48.450	At most 1
	0.297	16.724	25.320	30.450	At most 2
Grenada					
		Likelihood	5 Percent	1 Percent	Hypothesized
Eigenvalue		Ratio	Critical Value	Critical Value	No. of CE(s)
	0.872	148,733	87,310	96,580	None **
	0.540	41.661	42.440	48,450	At most 1
	0 284	16 058	25 320	30 450	At most 2
	0.201		201020		
Mandaland					
Wontserrat					
Wontserrat		Likelihood	5 Percent	1 Percent	Hypothesized
Figenvalue		Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized
Eigenvalue	0.869	Likelihood Ratio 111 200	5 Percent Critical Value 62 990	1 Percent Critical Value 70.050	Hypothesized No. of CE(s) None **
Eigenvalue	0.869	Likelihood Ratio 111.200	5 Percent Critical Value 62.990 25.320	1 Percent Critical Value 70.050 30.450	Hypothesized No. of CE(s) None **
Eigenvalue	0.869	Likelihood Ratio 111.200 19.411 5.736	5 Percent Critical Value 62.990 25.320 12.250	1 Percent Critical Value 70.050 30.450 16.260	Hypothesized No. of CE(s) None ** At most 1 At most 2
Eigenvalue	0.869 0.376 0.179	Likelihood Ratio 111.200 19.411 5.736	5 Percent Critical Value 62.990 25.320 12.250	1 Percent Critical Value 70.050 30.450 16.260	Hypothesized No. of CE(s) None ** At most 1 At most 2
Eigenvalue	0.869 0.376 0.179	Likelihood Ratio 111.200 19.411 5.736	5 Percent Critical Value 62.990 25.320 12.250	1 Percent Critical Value 70.050 30.450 16.260	Hypothesized No. of CE(s) None ** At most 1 At most 2
Eigenvalue	0.869 0.376 0.179	Likelihood Ratio 111.200 19.411 5.736	5 Percent Critical Value 62.990 25.320 12.250	1 Percent Critical Value 70.050 30.450 16.260	Hypothesized No. of CE(s) None ** At most 1 At most 2
Eigenvalue St. Kitts	0.869 0.376 0.179	Likelihood Ratio 111.200 19.411 5.736	5 Percent Critical Value 62.990 25.320 12.250	1 Percent Critical Value 70.050 30.450 16.260	Hypothesized No. of CE(s) None ** At most 1 At most 2
St. Kitts	0.869 0.376 0.179	Likelihood Ratio 111.200 19.411 5.736 Likelihood	5 Percent Critical Value 62.990 25.320 12.250 5 Percent Critical Value	1 Percent Critical Value 70.050 30.450 16.260	Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized
Eigenvalue St. Kitts Eigenvalue	0.869 0.376 0.179	Likelihood Ratio 111.200 19.411 5.736 Likelihood Ratio	5 Percent Critical Value 62.990 25.320 12.250 5 Percent Critical Value 87.310	1 Percent Critical Value 70.050 30.450 16.260 1 Percent Critical Value	Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s)
St. Kitts Eigenvalue	0.869 0.376 0.179 0.803 0.803	Likelihood Ratio 111.200 19.411 5.736 Likelihood Ratio 132.218	5 Percent Critical Value 62.990 25.320 12.250 5 Percent Critical Value 87.310 42.440	1 Percent Critical Value 70.050 30.450 16.260 1 Percent Critical Value 96.580 48.450	Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None **
St. Kitts Eigenvalue	0.869 0.376 0.179 0.803 0.502 0.267	Likelihood Ratio 111.200 19.411 5.736 Likelihood Ratio 132.218 41.937 18.906	5 Percent Critical Value 62.990 25.320 12.250 5 Percent Critical Value 87.310 42.440 25.320	1 Percent Critical Value 70.050 30.450 16.260 1 Percent Critical Value 96.580 48.450 30.465	Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2
St. Kitts	0.869 0.376 0.179 0.803 0.803 0.502 0.267	Likelihood Ratio 111.200 19.411 5.736 Likelihood Ratio 132.218 41.937 18.906	5 Percent Critical Value 62.990 25.320 12.250 5 Percent Critical Value 87.310 42.440 25.320	1 Percent Critical Value 70.050 30.450 16.260 1 Percent Critical Value 96.580 48.450 30.450	Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2
St. Kitts Eigenvalue	0.869 0.376 0.179 0.803 0.803 0.502 0.267	Likelihood Ratio 111.200 19.411 5.736 Likelihood Ratio 132.218 41.937 18.906	5 Percent Critical Value 62.990 25.320 12.250 5 Percent Critical Value 87.310 42.440 25.320	1 Percent Critical Value 70.050 30.450 16.260 1 Percent Critical Value 96.580 48.450 30.450	Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2
St. Kitts Eigenvalue St. Lucia	0.869 0.376 0.179 0.803 0.502 0.267	Likelihood Ratio 111.200 19.411 5.736 Likelihood Ratio 132.218 41.937 18.906	5 Percent Critical Value 62.990 25.320 12.250 5 Percent Critical Value 87.310 42.440 25.320	1 Percent Critical Value 70.050 30.450 16.260 1 Percent Critical Value 96.580 48.450 30.450	Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2
St. Kitts Eigenvalue St. Lucia	0.869 0.376 0.179 0.803 0.502 0.267	Likelihood Ratio 111.200 19.411 5.736 Likelihood Ratio 132.218 41.937 18.906 Likelihood	5 Percent Critical Value 62.990 25.320 12.250 5 Percent Critical Value 87.310 42.440 25.320 5 Percent	1 Percent Critical Value 70.050 30.450 16.260 1 Percent Critical Value 96.580 48.450 30.450 1 Percent	Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized
St. Kitts Eigenvalue St. Lucia Eigenvalue	0.869 0.376 0.179 0.803 0.502 0.267	Likelihood Ratio 111.200 19.411 5.736 Likelihood Ratio 132.218 41.937 18.906 Likelihood Ratio	5 Percent Critical Value 62.990 25.320 12.250 5 Percent Critical Value 87.310 42.440 25.320 5 Percent Critical Value	1 Percent Critical Value 70.050 30.450 16.260 1 Percent Critical Value 96.580 48.450 30.450 1 Percent Critical Value 0 C C 200	Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s)
St. Kitts Eigenvalue St. Lucia Eigenvalue	0.869 0.376 0.179 0.803 0.502 0.267	Likelihood Ratio 111.200 19.411 5.736 Likelihood Ratio 132.218 41.937 18.906 Likelihood Ratio 110.809	5 Percent Critical Value 62.990 25.320 12.250 5 Percent Critical Value 87.310 42.440 25.320 5 Percent Critical Value 87.00 6 Percent Critical Value 87.300 5 Percent	1 Percent Critical Value 70.050 30.450 16.260 1 Percent Critical Value 96.580 48.450 30.450 1 Percent Critical Value 96.580 48.450 30.450	Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None **
St. Kitts Eigenvalue St. Lucia Eigenvalue	0.869 0.376 0.179 0.803 0.502 0.267 0.267	Likelihood Ratio 111.200 19.411 5.736 Likelihood Ratio 132.218 41.937 18.906 Likelihood Ratio 110.809 65.398	5 Percent Critical Value 62.990 25.320 12.250 5 Percent Critical Value 87.310 42.440 25.320 5 Percent Critical Value 87.310 62.990 42.441	1 Percent Critical Value 70.050 30.450 16.260 1 Percent Critical Value 96.580 48.450 30.450 1 Percent Critical Value 96.580 70.050 49.450	Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 *
St. Kitts Eigenvalue St. Lucia Eigenvalue	0.869 0.376 0.179 0.803 0.502 0.267 0.267 0.267 0.535 0.362	Likelihood Ratio 111.200 19.411 5.736 Likelihood Ratio 132.218 41.937 18.906 Likelihood Ratio 110.809 65.398 37.825	5 Percent Critical Value 62.990 25.320 12.250 5 Percent Critical Value 87.310 42.440 25.320 5 Percent Critical Value 87.310 62.990 42.440	1 Percent Critical Value 70.050 30.450 16.260 1 Percent Critical Value 96.580 48.450 30.450 1 Percent Critical Value 96.580 70.050 48.450	Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 * At most 1 * At most 2
St. Kitts Eigenvalue St. Lucia Eigenvalue	0.869 0.376 0.179 0.803 0.502 0.267 0.267 0.267 0.535 0.362	Likelihood Ratio 111.200 19.411 5.736 Likelihood Ratio 132.218 41.937 18.906 Likelihood Ratio 110.809 65.398 37.825	5 Percent Critical Value 62.990 25.320 12.250 5 Percent Critical Value 87.310 42.440 25.320 5 Percent Critical Value 87.310 62.990 42.440	1 Percent Critical Value 70.050 30.450 16.260 1 Percent Critical Value 96.580 48.450 30.450 1 Percent Critical Value 96.580 70.050 48.450	Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 * At most 1 * At most 2
St. Kitts Eigenvalue St. Lucia Eigenvalue	0.869 0.376 0.179 0.803 0.502 0.267 0.267 0.717 0.535 0.362	Likelihood Ratio 111.200 19.411 5.736 Likelihood Ratio 132.218 41.937 18.906 Likelihood Ratio 110.809 65.398 37.825	5 Percent Critical Value 62.990 25.320 12.250 5 Percent Critical Value 87.310 42.440 25.320 5 Percent Critical Value 87.310 62.990 42.440	1 Percent Critical Value 70.050 30.450 16.260 1 Percent Critical Value 96.580 48.450 30.450 1 Percent Critical Value 96.580 70.050 48.450	Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 * At most 1 * At most 2
St. Lucia Eigenvalue St. Lucia St. Lucia	0.869 0.376 0.179 0.803 0.502 0.267 0.267 0.535 0.362	Likelihood Ratio 111.200 19.411 5.736 Likelihood Ratio 132.218 41.937 18.906 Likelihood Ratio 110.809 65.398 37.825	5 Percent Critical Value 62.990 25.320 12.250 5 Percent Critical Value 87.310 42.440 25.320 5 Percent Critical Value 87.310 62.990 42.440	1 Percent Critical Value 70.050 30.450 16.260 1 Percent Critical Value 96.580 48.450 30.450 1 Percent Critical Value 96.580 70.050 48.450	Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 * At most 1 * At most 2
St. Lucia Eigenvalue St. Lucia St. Lucia	0.869 0.376 0.179 0.803 0.502 0.267 0.267 0.535 0.362	Likelihood Ratio 111.200 19.411 5.736 Likelihood Ratio 132.218 41.937 18.906 Likelihood Ratio 110.809 65.398 37.825	5 Percent Critical Value 62.990 25.320 12.250 5 Percent Critical Value 87.310 42.440 25.320 5 Percent Critical Value 87.310 62.990 42.440	1 Percent Critical Value 70.050 30.450 16.260 1 Percent Critical Value 96.580 48.450 30.450 1 Percent Critical Value 96.580 70.050 48.450 1 Percent	Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 * At most 1 * At most 2 Hypothesized
St. Lucia Eigenvalue St. Lucia St. Lucia Eigenvalue St. Vincent Eigenvalue	0.869 0.376 0.179 0.803 0.502 0.267 0.267 0.717 0.535 0.362	Likelihood Ratio 111.200 19.411 5.736 Likelihood Ratio 132.218 41.937 18.906 Likelihood Ratio 110.809 65.398 37.825 Likelihood Ratio	5 Percent Critical Value 62.990 25.320 12.250 5 Percent Critical Value 87.310 42.440 25.320 5 Percent Critical Value 87.310 62.990 42.440 5 Percent Critical Value	1 Percent Critical Value 70.050 30.450 16.260 1 Percent Critical Value 96.580 48.450 30.450 1 Percent Critical Value 96.580 70.050 48.450 1 Percent Critical Value	Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 * At most 1 * At most 2 Hypothesized No. of CE(s)
St. Kitts Eigenvalue St. Kitts Eigenvalue St. Lucia Eigenvalue St. Vincent Eigenvalue	0.869 0.376 0.179 0.803 0.502 0.267 0.267 0.535 0.362	Likelihood Ratio 111.200 19.411 5.736 Likelihood Ratio 132.218 41.937 18.906 Likelihood Ratio 110.809 65.398 37.825 Likelihood Ratio Likelihood Ratio	5 Percent Critical Value 62.990 25.320 12.250 5 Percent Critical Value 87.310 42.440 25.320 5 Percent Critical Value 87.310 62.990 42.440 5 Percent Critical Value 87.310 62.990	1 Percent Critical Value 70.050 30.450 16.260 1 Percent Critical Value 96.580 48.450 30.450 1 Percent Critical Value 96.580 70.050 48.450 1 Percent Critical Value 96.580 70.050	Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 * At most 2 Hypothesized No. of CE(s) None **
St. Kitts Eigenvalue St. Lucia Eigenvalue St. Vincent Eigenvalue	0.869 0.376 0.179 0.803 0.502 0.267 0.267 0.535 0.362 0.362 0.362	Likelihood Ratio 111.200 19.411 5.736 Likelihood Ratio 132.218 41.937 18.906 Likelihood Ratio 110.809 65.398 37.825 Likelihood Ratio 141.344 48.062	5 Percent Critical Value 62.990 25.320 12.250 5 Percent Critical Value 87.310 42.440 25.320 5 Percent Critical Value 87.310 62.990 42.440 5 Percent Critical Value 87.310 62.910 42.440	1 Percent Critical Value 70.050 30.450 16.260 1 Percent Critical Value 96.580 48.450 30.450 1 Percent Critical Value 96.580 70.050 48.450 1 Percent Critical Value 96.580 48.450	Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 At most 2 Hypothesized No. of CE(s) None ** At most 1 * At most 2 Hypothesized No. of CE(s) None ** At most 1 * At most 1 * At most 2

Table A.12.2 Co-integration Tests for Development Model Data


Reaction Functions - Price Model

Figure A.17 Reaction Functions Anguilla



Figure A.18 Reaction Functions Antigua



Figure A.19 Reaction Functions Dominica



Figure A.20 Reaction Functions Grenada



Figure A.21 Reaction Functions Montserrat



Figure A.22 Reaction Functions St. Kitts and Nevis



Figure A.23 Reaction Functions St. Lucia



Figure A.24 Reaction Functions St. Vincent and the Grenadines



Reaction Functions - Development Model

Figure A.25 Reaction Functions Anguilla



Figure A.26 Reaction Functions Antigua



Figure A.27 Reaction Functions Dominica



Figure A.28 Reaction Functions Grenada



Figure A.29 Reaction Functions Montserrat



Figure A.30 Reaction Functions S. Kitts and Nevis



Figure A.31 Reaction Functions St. Lucia



Figure A.32 Reaction Functions St. Vincent and the Grenadines

APPENDIX B

SUMMARY OF OECS ECONOMIES

Anguilla

Anguilla has few natural resources, and the economy depends heavily on luxury tourism, offshore banking, lobster fishing, and remittances from emigrants. Increased activity in the tourism industry has spurred the growth of the construction sector contributing to economic growth. Anguillan officials have put substantial effort into developing the offshore financial sector, which is small but growing. In the medium term, prospects for the economy will depend largely on the tourism sector and, therefore, on revived income growth in the industrialized nations as well as on favorable weather conditions.

Antigua and Barbuda

Tourism continues to dominate Antigua and Barbuda's economy, accounting for nearly 60% of GDP and 40% of investment. The dual-island nation's agricultural production is focused on the domestic market and constrained by a limited water supply and a labor shortage stemming from the lure of higher wages in tourism and construction. Manufacturing comprises enclave-type assembly for export with major products being bedding, handicrafts, and electronic components. Prospects for economic growth in the medium term will continue to depend on tourist arrivals from the US, Canada, and Europe and potential damages from natural disasters.

St Kitts and Nevis

The economy of Saint Kitts and Nevis is heavily dependent upon tourism revenues, which has replaced sugar, the traditional mainstay of the economy until the 1970s. Following the 2005 harvest, the government closed the sugar industry after decades of losses of 3-4% of GDP annually. To compensate for employment losses, the government has embarked on a program to diversify the agricultural sector and to stimulate other sectors of the economy, such as tourism, export-oriented manufacturing, and offshore banking.

Dominica

The Dominican economy has been dependent on agriculture - primarily bananas - in years past, but increasingly has been driven by tourism as the government seeks to promote Dominica as an

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"ecotourism" destination. In order to diversify the island's production base, the government also is attempting to develop an offshore financial sector and has signed an agreement with the EU to develop geothermal energy resources. In 2003, the government began a comprehensive restructuring of the economy - including elimination of price controls, privatization of the state banana company, and tax increases.

Grenada

Grenada relies on tourism as its main source of foreign exchange especially since the construction of an international airport in 1985. Hurricanes Ivan (2004) and Emily (2005) severely damaged the agricultural sector - particularly nutmeg and cocoa cultivation - which had been a key driver of economic growth. Strong performances in construction and manufacturing, together with the development of tourism and an offshore financial industry, have also contributed to growth in national output.

St. Lucia

The island nation has been able to attract foreign business and investment, especially in its offshore banking and tourism industries, with a surge in foreign direct investment in 2006, attributed to the construction of several tourism projects. Although crops such as bananas, mangos, and avocados continue to be grown for export, tourism provides Saint Lucia's main source of income and the industry is the island's biggest employer. Tourism is also the main source of foreign exchange. The manufacturing sector is the most diverse in the Eastern Caribbean area, and the government is trying to revitalize the banana industry, although recent hurricanes have caused exports to contract.

St. Vincent and the Grenadines

Success of the economy hinges upon seasonal variations in agriculture, tourism, and construction activity as well as remittance inflows. Much of the workforce is employed in banana production and

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tourism, but persistent high unemployment has prompted many to leave the islands. Saint Vincent is home to a small offshore banking sector and has moved to adopt international regulatory standards.

Montserrat

Severe volcanic activity, which began in July 1995, has put a damper on this small, open economy. A catastrophic eruption in June 1997 closed the airports and seaports, causing further economic and social dislocation. Two-thirds of the 12,000 inhabitants fled the island. Some began to return in 1998 but lack of housing limited the number. The agriculture sector continued to be affected by the lack of suitable land for farming and the destruction of crops. Prospects for the economy depend largely on developments in relation to the volcanic activity and on public sector construction activity. The UK has launched a three-year \$122.8 million aid program to help reconstruct the economy. Half of the island is expected to remain uninhabitable for another decade.

(Source: CIA World Factbook)

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APPENDIX C

INTERVIEW QUESTIONS FOR THE EASTERN CARIBBEAN CENTRAL BANK OFFICIALS

- 1. Is monetary policy created for each island individually, or for the region as a whole?
- 2. Can you describe the process of creating monetary policy for the ECCB?
- 3. How do the ECCB identify issues to be addressed/what is the process of identifying economic and social issues?
- 4. Once the issue is identified how is it addressed/ what is the process of addressing economic and social issues?
- 5. Do the ECCB monitor the impact of the policy response after it has been implemented?
- 6. Can you describe an example/s of issues that have arisen and the bank created policy to address them?
- Is there a place that I can find documentation of an actual ECCB policy response to a social or economic issue
- 8. What are the indicators monitored when deciding on areas requiring policy prescriptions?

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BIOGRAPHICAL INFORMATION

Moses Pologne was born in Castries, St. Lucia on May 10, 1974. He graduated from the University of the West Indies, Cave Hill Campus in May 1997, with as Bachelor of Science in Economics and Management. In 2005, Mr. Pologne obtained a Master of Science in Economics from the University of Texas at El Paso. He commenced his doctoral studies in August 2007 in Urban Planning and Public Policy at the University of Texas at Arlington and is graduating in May 2012. Under the supervision of Dr. Rod Hissong, his research focuses on the ability of monetary policy to be used as an economic development tool at the local level in the Organization of Eastern Caribbean States. Presently, Mr. Pologne works at the Institute of Urban Studies (IUS) as a Research Associate. Prior to working at IUS he was employed as an Economic Development Assistant in the Economic Development Department of the City of Dallas from July 2008 to August 2009. Mr. Pologne has additional work experience being employed as a Research Assistant and Program Coordinator with the Center for Institutional Evaluation Research and Planning at the University of Texas at El Paso, during the period August 2005 to June 2006. He was also employed in the Budget Office in the Ministry of Finance in St. Lucia as a Budget Analyst and later as an Economist, from May 1999 to December 2005.