



DOMINICA

SELECTED ISSUES

December 2017

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DOMINICA

SELECTED ISSUES

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Approved By
**Western Hemisphere
Department**

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OPTIMAL MANAGEMENT OF CITIZENSHIP-BY-INVESTMENT PROGRAM REVENUES IN DOMINICA

Dominica's Citizenship by Investment (CBI) inflows have reached near 10 percent of GDP, increasing the country's reliance on these revenues. This paper argues that given their volatile and unpredictable nature, CBI revenues should be used prudently. Their use should be mindful of the chances of a sudden stop in these flows. It is therefore key to prioritize investment, debt reduction, and saving in lieu of current expenditure, which is typically more difficult to reverse. Simulation analysis based on fiscal multipliers indicate that such combination of policies would boost GDP and help reach the regional debt target of 60 percent of GDP by 2030 as committed by the government.

A. Introduction

1. Government revenues from the CBI in Dominica are expected to reach record-high levels of near 10 percent of GDP in the near term, which is multiple times the amounts of recent years.

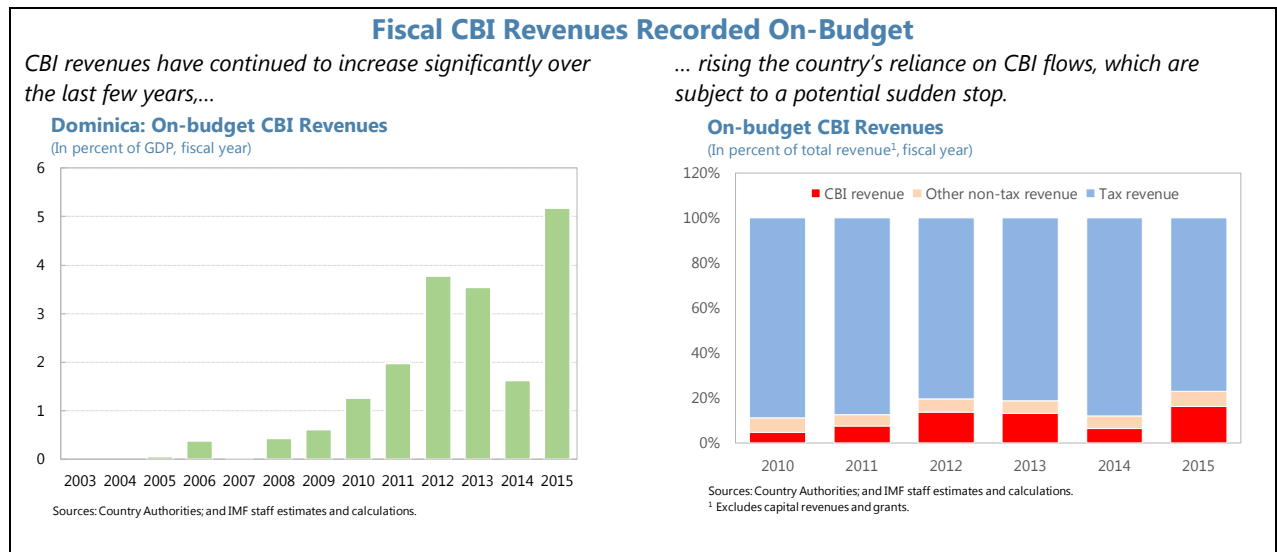
Citizenship by Investment program (CBI) has existed in Dominica since 1993, but only recently has the scope of revenues reached significant dimensions, contributing close to 5 percent¹ of GDP – which is equivalent to about 16 percent of total revenues² – to the central government budget, which until now have largely been used to finance infrastructure projects (Box 1). Overall inflows into the economy, however, are larger, also stemming from private³ operations.

2. **The growing reliance on CBI revenues to finance government expenditure, however, could potentially prove detrimental to fiscal sustainability given the risk of a sudden stop.** This could be due to changes in advanced countries' migration policies, or competition from other countries with similar programs (Box 2). Given the high degree of uncertainty associated with the CBI inflows, this paper aims to illustrate how different policy options for their allocation could affect Dominica's growth and other key macroeconomic indicators.

¹ This figure excludes private investment arm of the program, and contributions to the government not transferred on-budget. Contributions to the government are initially recorded off-budget and stored in a separate bank account, the funds are transferred to the budget as needed.

² Estimates cited based on FY2015/16; revenues exclude grants.

³ Private arm of Dominica's CBI program was added recently.



3. This paper argues that the risk of a sudden stop in CBI revenues makes it important to use them for capital expenditure, debt reduction, and saving. This could prove critical to maximize the long-term benefits in output and welfare, and thus it would help to avoid a sharp fiscal adjustment in the event of a sudden stop in CBI revenues. Over-reliance on the CBI inflows can generate a number of challenges in the event of a sudden stop, particularly for such a small state as Dominica. To highlight this risk, this paper simulates two sudden stops in CBI scenarios from current high levels, one after 5 years and the other after 2 years, corresponding to relatively more optimistic vs. more pessimistic scenarios, respectively. This unpredictability of CBI inflows also makes the choice of the right combination of policies for the use of CBI funds of crucial importance. While the significant CBI receipts may create space to relax fiscal discipline, and increase current spending in the near-term, such policies could potentially put the country's fiscal and external sustainability at risk. Alternatively, their allocation to infrastructure, debt consolidation, and saving accumulation at a pace that is consistent with the state of the business cycle and the availability of production factors would improve the net asset position of the government. It would contribute to (i) close the infrastructure gap, and raise the level of output and wages; (ii) consolidate public debt, reducing interest costs and increase the country's fiscal space – critical given that Dominica is an undiversified small state subject to large natural disasters and with no monetary policy⁴; and (iii) meanwhile saving accumulation would help smooth the fiscal adjustment if CBI revenues decline or come to a sudden stop.

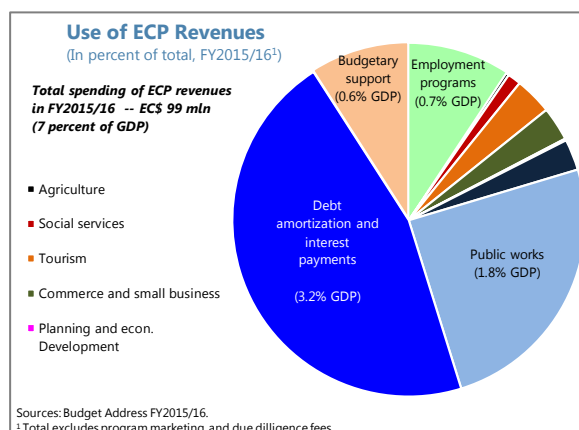
4. The paper proceeds with three sections. In this respect, section B summarizes the policy framework used to illustrate scenarios, while section C outlines simulations results, and section D states the main conclusions and recommendations for the use of CBI revenues.

⁴ Dominica belongs to the ECCU currency union, which operates under a quasi currency board arrangement administered by the Eastern Caribbean Central Bank.

Box. 1. Recent Allocation of CBI Revenues

The use of CBI funds so far has largely targeted post-Erika¹ reconstruction and infrastructure rehabilitation, and debt reduction. In FY 2015/16, gross CBI inflows constituted close to 20 percent of GDP, of which 2.4 percent of GDP was spent on promotion, marketing and due diligence²; 7 percent of GDP was utilized, leaving almost 12 percent of GDP in the bank accounts at the end of the fiscal year. The amount of CBI utilized during FY2015/16 constituted EC\$ 99 million, equivalent to about 7 percent of GDP³, and was in part used to substitute the lower than

previously anticipated grants after the tropical storm Erika. These CBI funds were largely spent on a combination on policies aimed at rebuilding infrastructure, consolidating and servicing debt, and promoting employment opportunities (text chart). Specifically, debt amortization and servicing comprised the largest portion of about 3.2 percent of GDP. Spending on public works targeted a number of infrastructure and renewal energy projects, including solar street lighting implementation, and reconstruction and rehabilitation of roads and bridges post-Erika. The largest outlay, however, contributed to financing the emergency infrastructure works at the Douglas Charles Airport in the aftermath of the tropical storm Erika, meanwhile a significant share of CBI revenues was also attributed to financing the National Employment program (about 0.7 percent of GDP). The remaining funds were spent on social services, agriculture, tourism, housing, and commercial development (Budget Address, FY2015/16).



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1/ On August 27, 2015, Dominica was hit by Tropical Storm Erika, resulting in loss of life and substantial damage to crops and physical infrastructure. The damage was estimated at US\$483 million or 96 percent of GDP, of which 65 percent are attributed to the public sector reconstruction costs.

2/ Data indicate that due diligence fees represent about 5.6 percent of total gross revenues

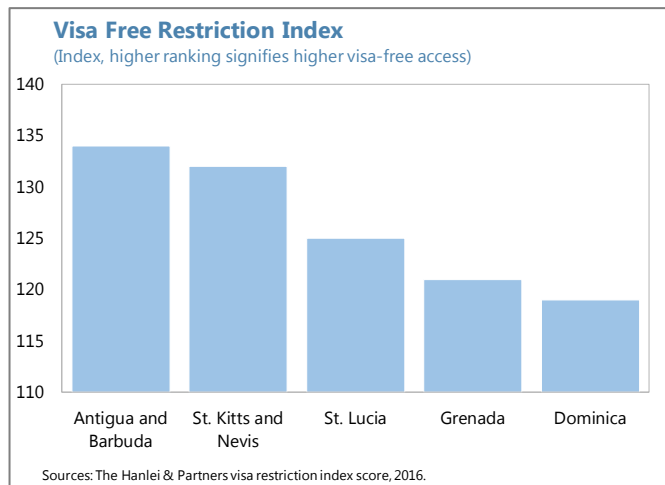
3/ About 5 percentage points of the 7 percent of GDP utilized in FY2015/16 were reflected in the central government budget, while the remaining was spent through State Owned Enterprises.

Box 2. OECS Citizenship Programs

The number of OECS citizenship programs has surged significantly in recent years, prompting increased competition within the region. Citizenship by Investment programs (CBI) – an arrangement which offers an opportunity to obtain citizenship in exchange for a substantial contribution to the domestic economy – now exist in most independent OECS states¹. The programs in St. Kitts and Nevis (1984) and Dominica (1993) are the oldest within the OECS, while CBI programs in other ECCU countries only began to appear after 2013. The structure of the programs is largely similar in nature across OECS as they usually require a contribution to the government and/or investments in a number of real estate projects approved by the government.² OECS programs typically have no citizenship qualifying period, and include either none or short residency requirements. In exchange for the contribution – and provided that applicants pass due diligence requirements – they receive the Dominican passport, which improves international mobility via visa-free access to 119 countries³, including the United Kingdom and the Schengen countries, offers tax planning options, and diversifies investment opportunities.

The appeal of the Dominica’s Citizenship by Investment program picked up momentum in recent years, arguably due to the authorities’ outreach activities and competitive pricing as well as external factors related to shifting global policies fueling interest in economic citizenship.

Until recently Dominica’s program remained the cheapest in the OECS, but St. Lucia’s recent announcement of its intentions to half the cost to single individuals to US\$100 thousand may broadly put the required financing needed to obtain a passport on-par with Dominica. The price of a single passport in other ECCU countries falls largely within US\$250 thousand. The price, however, is not the only factor that has contributed to the recent windfall in CBI revenues in Dominica. The volume of Dominica’s CBI revenues increased significantly in FY2015/16 also as a result of the promotion, marketing, and outreach efforts that the authorities have undertaken, which amounted to 1.1 percent of GDP. The surge in the demand for citizenship programs could also be in part driven by external factors, such as higher global uncertainty and growing emerging markets’ wealth, which fuel the interest in the citizenship programs.



1/ All OECS independent states, with the exception of St. Vincent and the Grenadines, have a citizenship program currently in place.

2/ Dominica currently has two options: one requires a contribution to the government national development fund of USD 100 thousand per applicant, or a contribution of USD 50 thousand to the government combined with a private real estate investment of USD 200 thousand (Xu et al., 2015).

3/ Based on visa-free access score calculated by The Henley & Partners, 2016. <https://www.henleyglobal.com/citizenship-dominica/>

B. Simulation Framework

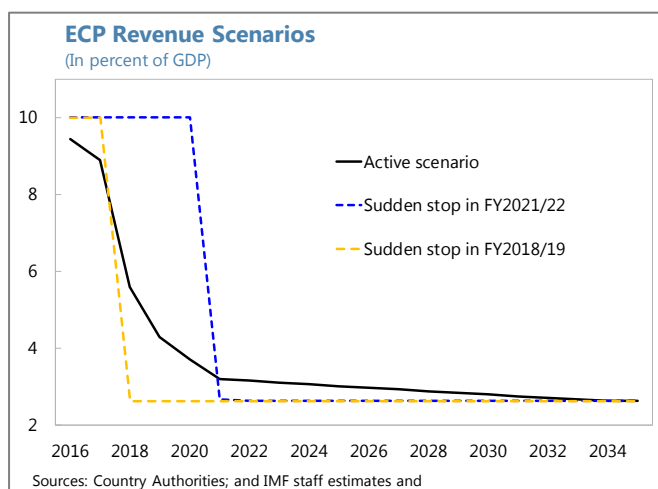
Uncertainty of CBI Inflows: The Risk of a Sudden Stop

5. Due to their unpredictable nature, modeling and forecasting CBI inflows is challenging.

While the Dominican passport essentially is the underlying asset, it is the ability to access countries with minimal visa requirements what is at the core of each CBI transaction. Thus, any potential changes in

advanced countries' immigration policies constitutes a significant risk, as visa restrictions imposed on Dominican citizens would reduce the appeal of the passport and lower the demand for the CBI program. In addition, competition from other countries with similar programs, especially within the Caribbean, can result in a race-to-the-bottom in terms of passport pricing. Poor CBI program due-diligence in any of the participating OECs economies could also affect the reputation of these programs in general. In the current complex global political and economic environment, the challenge to forecast CBI inflows becomes even more acute, making budget planning difficult to implement (see Box 1).

6. To illustrate the benefits and drawbacks of various policy options for the use of CBI funds, this paper assumes that CBI revenues come to a sudden stop. The simulations rely on two assumptions. First, the CBI revenues are assumed to remain at 10 percent of GDP for five consecutive years, on par with current CBI amounts and then come to a sudden stop, in which CBI revenues decline to 2.7 percent of GDP –in line with the levels in the years prior to the windfall. Second, CBI revenues are assumed to take the same levels, but the sudden stop takes place after only two years. These assumptions are chosen to capture two plausible sudden stop scenarios; one in which the windfall remains higher for a relatively long period of time, and another one in which the windfall stops as soon as the current pipeline of applicants is processed and revenues are collected.⁵



⁵ Note that the CBI projections in the active scenario – in which CBI receipts are forecast to decline from an estimate of 8.9 percent of GDP in FY2017/18 to a long-term average of about 3 percent of GDP – can be obtained through the expected value of ECP inflows totaling 10 percent of GDP with the probability 0.4 and 3 percent of GDP with the probability of 0.6 in each year (text chart). To illustrate the long-term effects of the policy choices, the results are displayed with a time horizon until 2035.

Policy Scenarios for the Use of CBI Funds⁶

7. Two sets of policy options are simulated: allocation to public debt reduction and investment; and allocation to public consumption.

In the Policy Scenario 1 the projected CBI revenues are used to finance an increase in public consumption. In the Policy Scenario 2, on the other hand, the projected CBI revenues are spent on public investment and debt reduction. As explained above, the effects of both scenarios are assessed assuming a prolong period of CBI windfall

inflows titled “high CBI” scenario (10 percent of GDP over a period of 5 years until a sudden stop in FY2021/22), and a short period of CBI inflows, named “low CBI” scenario (10 percent of GDP over 2 years until a sudden stop in FY2018/19) (text figure). To make this analysis consistent with the framework assumed in the active scenario, calculations are done based on deviations from the levels considered in the active scenario. All calculations are performed in real terms, using the GDP deflator. The main economic indicators analyzed include: GDP, capital expenditure, current expenditure, primary balance, interest expenditure, overall balance, debt stock, imports, and current account balance. The framework is set to capture the economic impact of the additional CBI revenues (CBI revenues above the level assumed under active scenario) relative to the projection in the Staff Report. The distribution of the additional CBI revenues under each assumption is shown in Figure 1.

		Simulation Scenarios	
		Policy Scenarios of Allocation of CBI Revenues:	
		Policy scenario 1	Policy scenario 2
Sudden stop assumptions:	High CBI	Allocation toward public consumption (Sudden stop in CBI after 5 years)	Allocation toward public investment and debt reduction (Sudden stop in CBI after 5 years)
	Low CBI	Allocation toward public consumption (Sudden stop in CBI after 2 years)	Allocation toward public investment and debt reduction (Sudden stop in CBI after 2 years)

8. The framework calculates the impact of the different CBI sudden stop and Policy Scenarios based on fiscal multipliers:

- Gross Domestic Product.** To calculate the effect of raising public investment on GDP, it is assumed that public consumption has a fiscal multiplier of 0.2, that is, for every EC\$ dollar spent in public consumption there is a EC\$0.2 increase in output. This is a relatively low multiplier, in line with Dominica’s fundamentals as a small-open and undiversified economy, with a currency peg to the US dollar. A large share of public consumption spending is expected to finance consumer imports and therefore to have a limited stimulatory impact on output. The impact of public consumption on output is assumed to be contemporaneous, and to have no protracted effect. This assumption

⁶ For the purposes of this analysis, all CBI revenues are assumed to be directly recorded in the central government budget as non-tax revenues in the period they are received. Until now, resources received through the Citizenship by Investment program have been deposited in the domestic banking sector, specifically in part at the National Bank of Dominica, but largely at the Royal Bank of Canada. Since fiscal accounts are managed on a cash basis, the government of Dominica transfers a portion of CBI revenues on budget to finance budgetary operations when it becomes necessary. Given that the information on the amount of receipts transferred on budget is more readily available, the following analysis assumes that all CBI inflows are directly recorded on budget in the fiscal period in which they are received.

underlies the presumption that the typical Dominican household operates under a hand-to-mouth rule, that is, it would consume most of the increase in income resulting from higher government consumption. The investment multiplier, on the other hand, is assumed to have a cumulative value equal to 1 over a four-year period after the investment expenditure is made. In the simulations, it is assumed that $\frac{2}{3}$ of total capital investment is used for labor compensation, and the remaining $\frac{1}{3}$ is physical capital buildup. It is then assumed that the retribution to labor affects output in line with the consumption multiplier of 0.2 in the concurrent year in which investment spending takes place, and that the capital buildup increases output only in the 3 years after to the investment spending – one third per year. The latter captures lag in construction and ensuring projects become fully productive.⁷

- **Primary Balance.** Primary balance is affected by 1) the additional inflow of non-tax CBI revenues above the active scenario, given that all CBI revenues are assumed to be recorded in the central government budget, 2) the additional tax revenue on imports, which are generated through the increased current spending and imported capital goods⁸, and 3) a higher tax base on domestic taxes given changes in GDP, initiated by increments either to current or capital expenditures⁹, and 4) primary balance declines in line with the scenario assumptions on spending on current and capital expenditure, and also with the endogenous change in tax revenues explained above.
- **Debt Stock.** Debt stock changes in line with the adjustments to the overall balance after accounting for changes in government deposits.
- **Interest expenditure.** Changes in net interest payments stem either from changes in the stock of debt and changes in interest payment receipts from deposits. The simulations use a real rate of return of 1 percent on government deposits.
- **Imports and Current Account Balance.** Current Account Balance reflects changes in imports, while exports are set to remain at the level assumed in the active scenario. Imports in turn are affected by changes in current and capital spending. The simulations assume that a one-unit increase in current or capital spending raises imports by 0.9. This is in fact a conservative assumption, as it is possible that in a Policy Scenario with higher public investment and debt reduction, output is higher and interest payments are lower, contributing to an improvement in the current account. Also, under a Policy Scenario with public consumption, output and the current account could deteriorate more than the impact on imports, especially if it leads to currency appreciation and loss of competitiveness.

⁷ Notice that the shares in factor retributions assumed are in line with typical calibrated parameters of a Cobb-Dougllass production function.

⁸ It is assumed that 90 percent of the additional capital expenditure (largely in the form of wages and salaries) is spent on imports.

⁹ We assume that the tax base increased by 10 percent as a result of higher GDP.

C. Simulation Results

Policy Scenario 1: Allocation of CBI Revenues to Public Consumption

9. The first policy scenario aims to illustrate the potential effects of allocating additional CBI windfall revenues toward current expenditure. For illustration purposes, this scenario considers a hypothetical situation where the additional CBI windfall revenues are allocated to current spending, which consists of wages and salaries, transfers to the public, and government purchases of goods and services. Specifically, this scenario assumes an increase in public wages by 12 percent over 3 years in real terms (annual increase of 4 percent in FY2017/18, FY2018/19, and FY2019/20¹⁰), and a boost to transfers and government's expenditures on goods and services of 15 percent in FY2017/18. This assumption is consistent with typical wage increase demands of labor unions in Dominica.¹¹ The increase in government's purchases of goods and services captures a pro-cyclical increase in public spending given the softening of the cash flow constraints on spending during the period of abundant CBI flows. This increase in current spending is treated as permanent. Before the CBI sudden stop, high CBI revenues result in a cash surplus and deposit accumulation. After the sudden stop, it is assumed that the government maintains its spending levels, which are financed with the accumulated deposits during the boom period in CBI revenue. Then, once deposits reach a minimum critical level,¹² it is assumed that public debt takes an increasing trajectory and becomes unsustainable, but financing constraints also result in a reduction of public investment. It is therefore assumed that current expenditure does not adjust, which captures the assumption that these are typically downward rigid.

10. The results illustrate the significant costs of a sudden stop in CBI flows if these were used for public consumption. Under empirically plausible assumptions, the scenario illustrates the tensions a government could face if a sudden stop was to occur, both in terms of forcing the government into difficult policy decisions, which may turn out to result in a decline in public investment and growth, and then in terms of threatening fiscal sustainability. In this scenario, while the additional CBI revenues outweigh the increases in current spending, the government is assumed to have sufficient funding to boost current spending and accumulate deposits. Simulations show that this would lead to higher primary balance due to the additional inflow of CBI, marginally declining debt stock due to the lower need to finance the overall deficit than in the active scenario, higher GDP as a result of additional current spending, but worsening current account balance due to high portion of imports in consumption (Figures 2A and 2B). After the sudden stop in CBI revenues, the simulations show an initial fall in deposits as they are used to finance the permanent increase in current expenditure. But after a significant decline in savings, as fiscal adjustment through public investment cuts and debt

¹⁰ Our scenario assumes 12 percent of increase in real terms over the 3 years, with the implied assumed inflation rate of 1 percent per year.

¹¹ In Dominica, similarly to some other OECS states, the government conducts public wage negotiations with the public sector representative bodies on a triannual basis with the aim to decide on the increase in the public sector wages, salaries and allowances. This scenario therefore aims to capture the proposals made in the current wage negotiations round, where requests made by the labor unions call for an increase in public salaries by 15 percent for the 2015-18 period.

¹² The minimum critical level of government deposits was selected based on historical patterns prior to the windfall in CBI revenues.

accumulation takes place, debt service and debt overhang rise, GDP declines to below the active scenario despite the assumption of higher CBI revenues, and the external positions worsens. Specifically, under the “high CBI” assumption, this would imply a fall in capital spending from about 7.5 percent of GDP in the active scenario to about 5.5 percent of GDP in the simulations under the Policy Scenario 1, and an increase in public debt to 74 percent of GDP by 2035. The decline in capital investment causes GDP to fall below the levels assumed in the active scenario. Under the “low CBI” assumption (Figure 3A and 3B), as the sudden stop is assumed to occur earlier, the adjustment in capital spending would begin earlier, and soon after the sudden stop in CBI revenues. This would require a larger needed adjustment in public investment (a fall to 4.6 percent of GDP) and higher accumulation of debt (up to 82 percent of GDP by 2035) to finance the increase in public expenditure.

Policy Scenario 2: Allocation of CBI Revenues toward Public Investment and Debt Consolidation

11. In Policy Scenario 2 it is assumed that a portion of the additional CBI windfall revenues is used to finance higher capital expenditure than in the baseline projection. The scenario assumes that there is an initial increase in public investment, but still below the full amount of additional CBI revenues. This captures both capacity constraints on planning and execution of public infrastructure, and also a prudent management of spending in the business cycle that avoids a sharp increase in domestic demand that can increase inflation, in light of supply constraints. As a result, during an initial period, the additional CBI receipts exceed the allocation in public investment. The government is then assumed to use the remaining funds for debt reduction and deposit accumulation. The savings allow the government to smooth public investment after the CBI revenues come to a sudden stop, and then to gradually return to the level of capital expenditure assumed in the active scenario. This way, there is no need for a sharp fiscal adjustment in rigid current spending, while deposits are slowly withdrawn to finish the pipeline of public investment projects on stream, and return to their initial level.

12. Unlike the situation presented in the first policy scenario, this combination of policies leads to significantly better macroeconomic performance over the long run. The debt stock and service decline largely due to debt repayment. In addition, and very importantly, real GDP rises permanently as a result of higher capital stock. Although the current account deteriorates due to increased imports associated with capital investment (Figures 2A, B and 3A, B), this deterioration is only transitory. Under the “high CBI” scenario (sudden stop in CBI in FY 2021/22), the simulation assumes that investment would return to the active scenario levels by FY 2028/29. This level is higher than in the Policy Scenario 1 given that there is no need to adjust deposits to avoid a contraction in public consumption – mainly wages – which are difficult to adjust. Under the “low CBI” scenario, the return to the active scenario occurs sooner, with a lower increase in capital spending. Given more limited CBI flows than in the “High CBI” simulation, capital expenditure returns to Active Scenario levels earlier. The economy evolves largely in line with the active scenario. The debt stock continues on a downward path, largely thanks to debt reduction efforts during the CBI windfall and a lower debt service burden. Real GDP remains permanently higher than in the active scenario.

D. Conclusion and Recommendations

13. A prudent management framework of CBI revenues is key, regardless of the expected duration of the windfall with priority given to capital spending, debt reduction and saving. Due to the highly volatile and unpredictable nature of CBI receipts, the policy options to allocate such revenues should be carefully examined with sufficient consideration given to potential effects on the country's medium and long-term macroeconomic fundamentals. To avoid the need for a sharp fiscal adjustment when the windfall revenues diminish or come to a sudden stop, priority should be given to boosting infrastructure, debt reduction, and saving. As shown in the two illustrative scenarios, additional capital expenditure would help close the infrastructure gap and permanently raise the level of income in the economy; saving accumulation would provide for a smooth transition when or if CBI revenues come to a sudden stop; meanwhile, debt reduction would help reduce Dominica's debt servicing burden and allow for a faster attainment of the regional debt target of 60 percent of GDP to which Dominica subscribes.

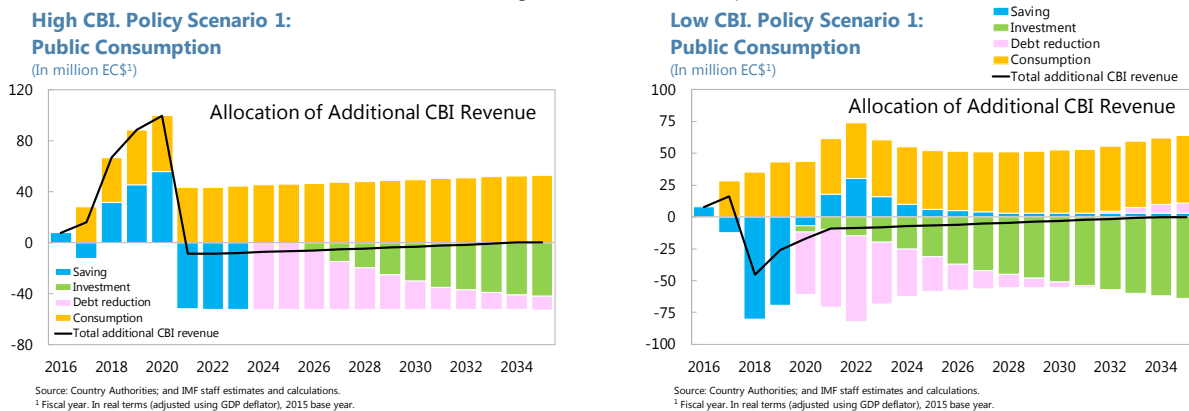
14. The long-term disadvantages of allocating additional CBI revenues to current expenditure outweigh the benefits. The simulations in this paper illustrate that using CBI flows to increase public consumption could lead to lower levels of output and threaten the sustainability of government finances. The paper shows that this is the case even if a sudden stop were to happen in the relatively later in time, after critical constraints affecting current expenditure decisions are considered. The social and political cost of unwinding current expenditures, given the sticky nature of wages and public transfers, would likely continue to affect the country long after the sudden stop in CBI takes place. Thus, given the CBI unpredictability, funding current spending with the CBI revenues could potentially lead to sustainability challenges and, plausibly, to a lower level of GDP by squeezing the fiscal space for public investment.

15. A strong transparency framework is therefore key to minimize risks to CBI flows and to maximize the potential revenues. This would reduce the risk of a sudden stop, and maximize the prospects for the long-term sustainability of this important revenue source.

Figure 1. Dominica: The Use of Additional CBI Revenues Under Different Scenarios

Policy Scenario 1: Current Spending

(under high and low CBI assumption)



Policy Scenario 2: Debt Consolidation and Public Investment

(under high and low CBI assumption)

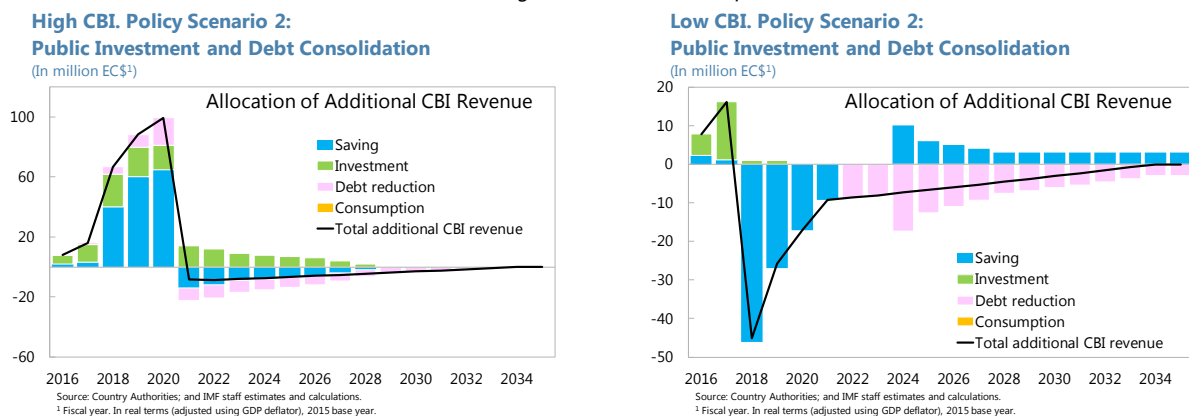
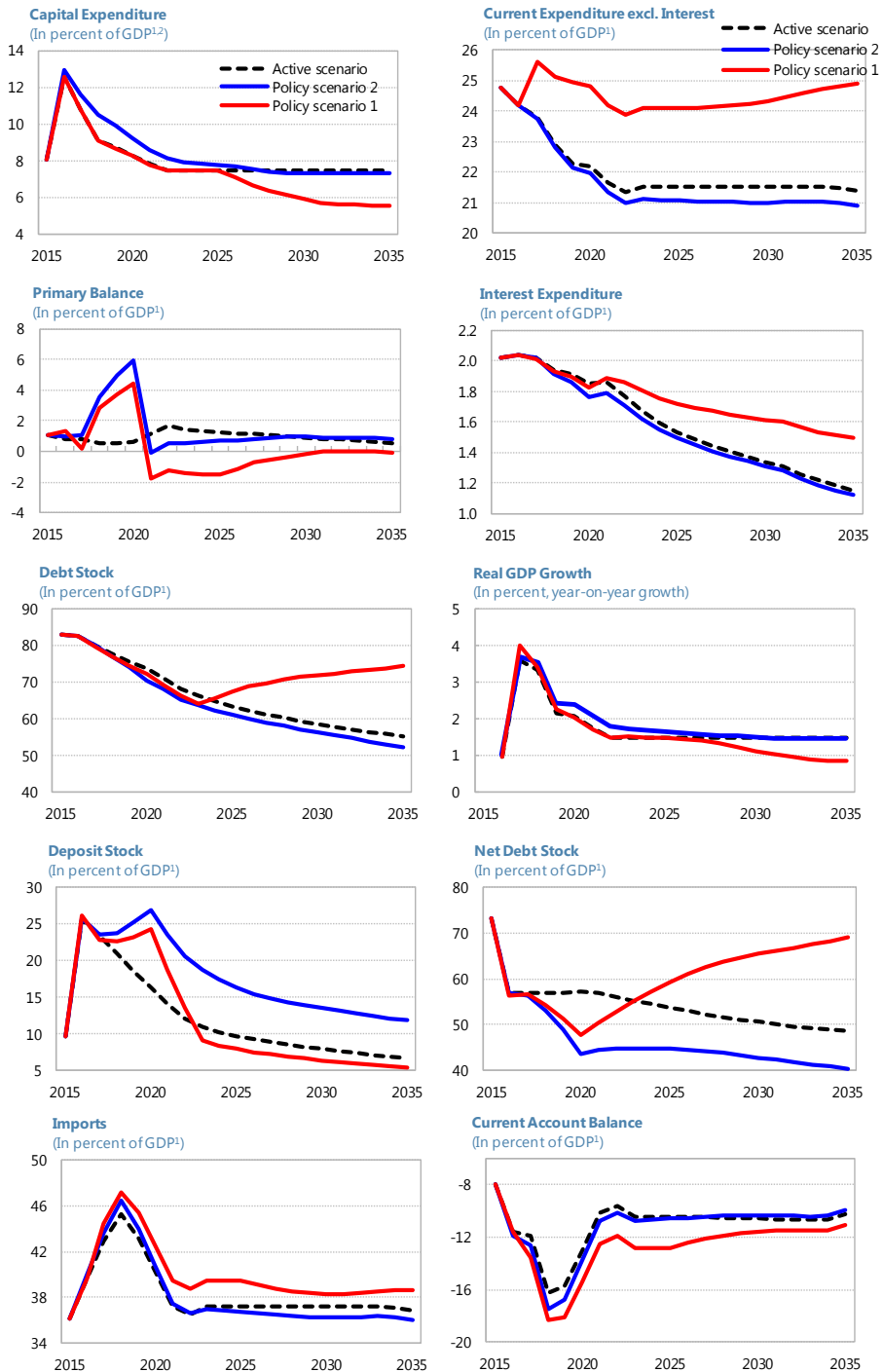
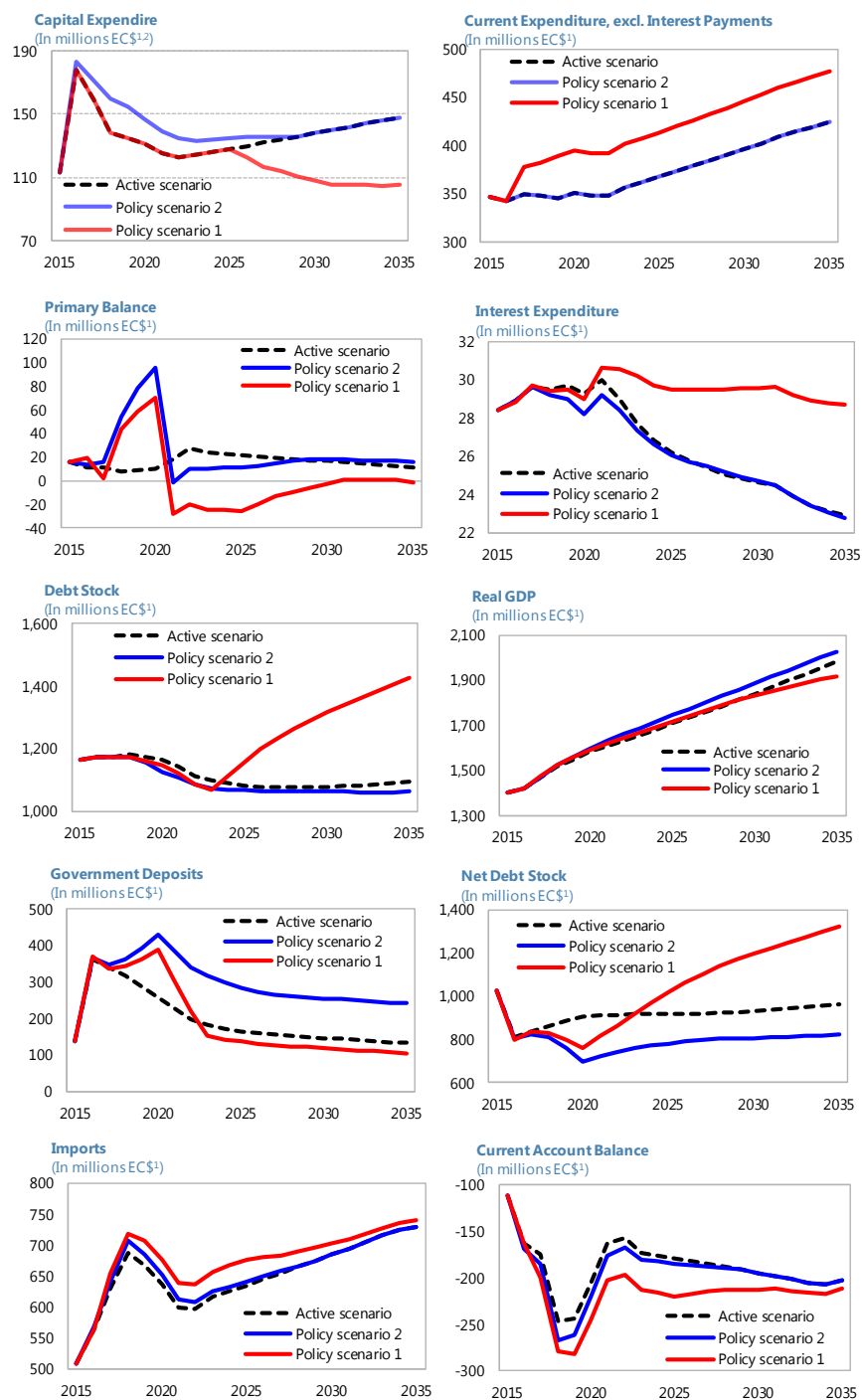


Figure 2a. Dominica: High CBI Scenario
(In percent of GDP)^{1,2}



Source: Country Authorities; and IMF staff estimates and calculations.
¹ Fiscal year. In real terms (adjusted using GDP deflator), 2015 base year.
² Policy scenario 1 assumes permanent increase in public consumption. Policy scenario 2 assumes increase in public investment and debt consolidation.

Figure 2b. Dominica: High CBI Scenario
(In million EC\$)^{1,2}

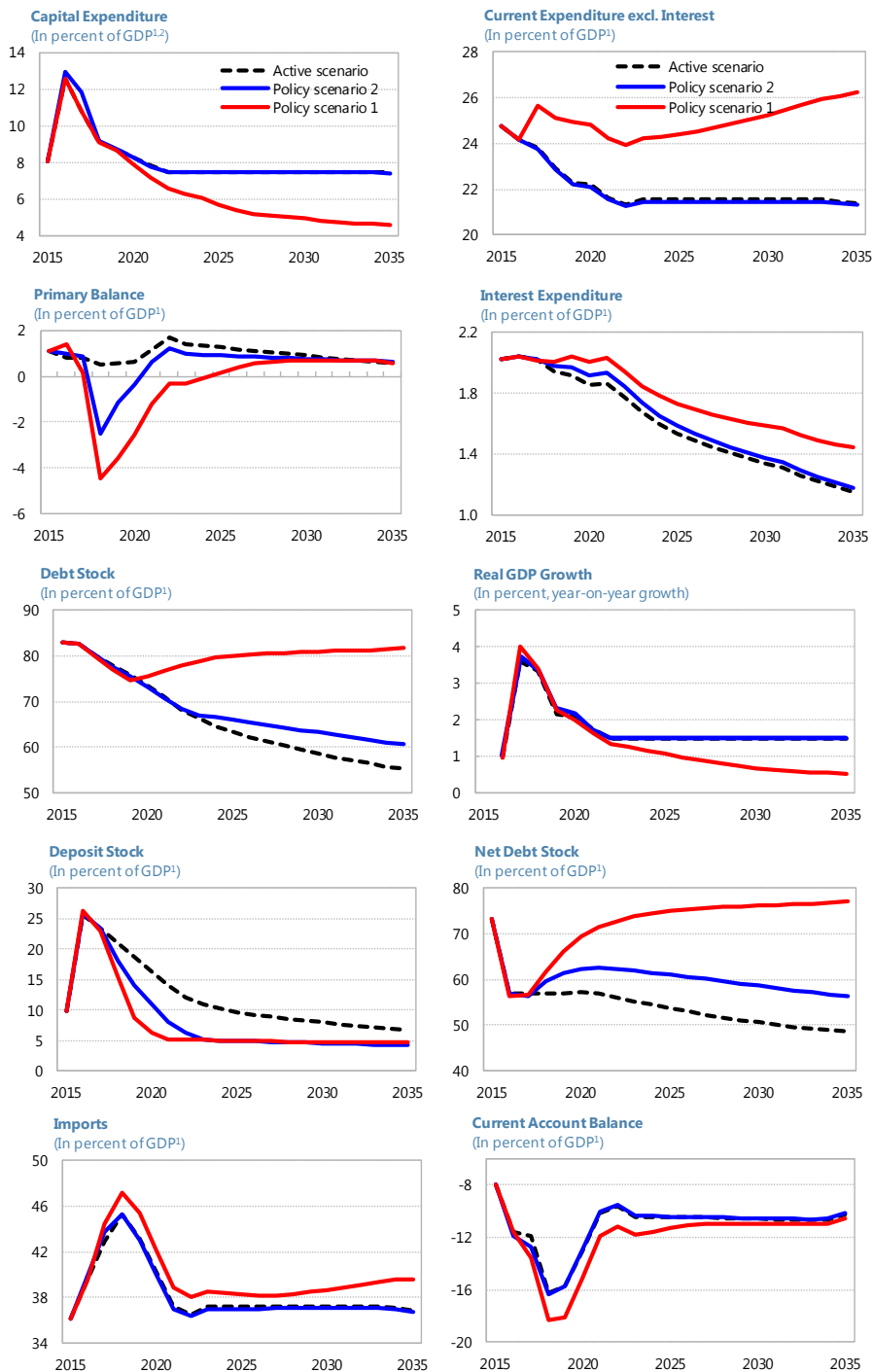


Source: Country Authorities; and IMF staff estimates and calculations.

¹ Fiscal year. In real terms (adjusted using GDP deflator), 2015 base year.

² Policy scenario 1 assumes permanent increase in public consumption. Policy scenario 2 assumes increase in public investment and debt consolidation.

Figure 3a. Dominica: Low CBI Scenario
(In percent of GDP)^{1,2}

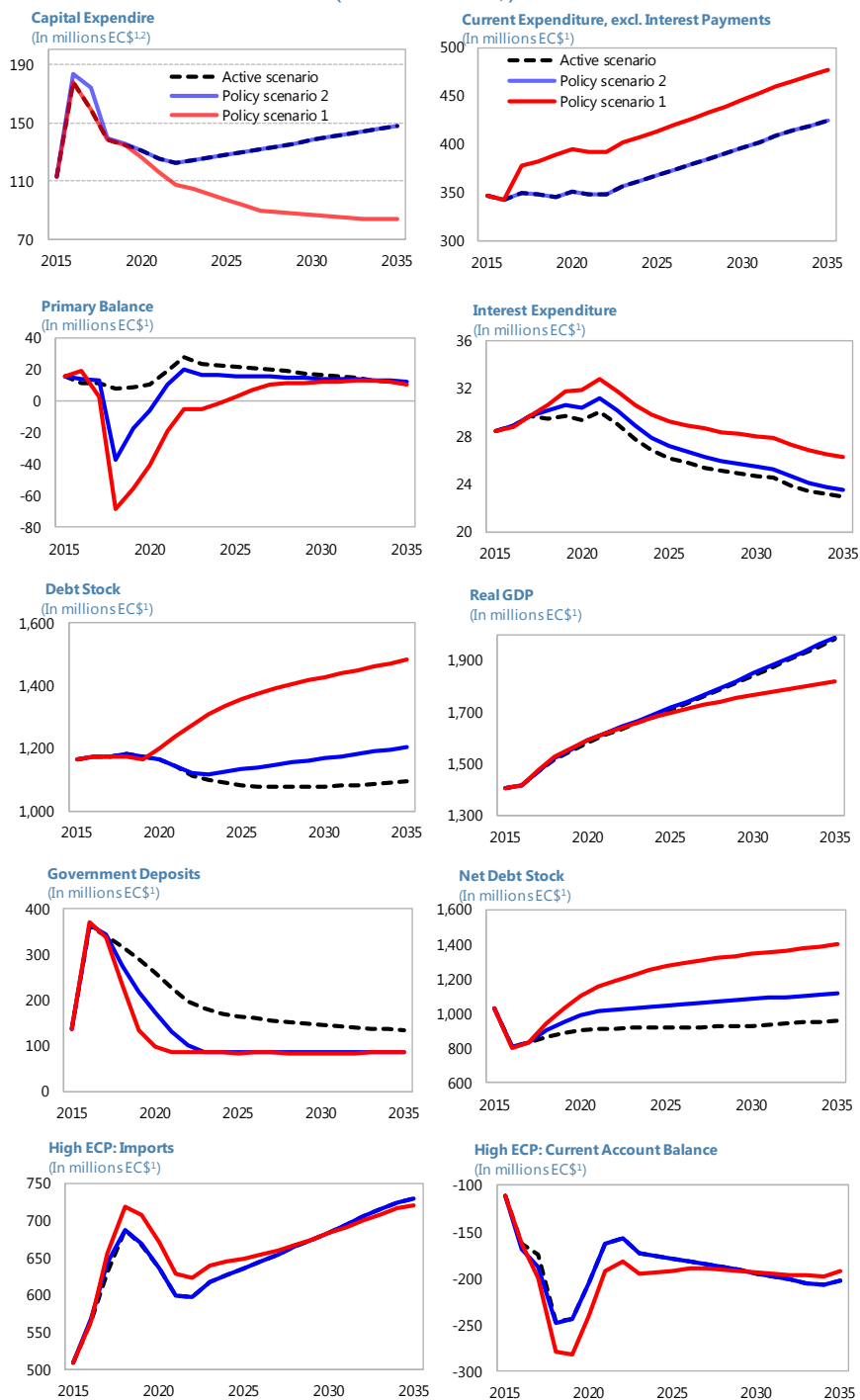


Source: Country Authorities; and IMF staff estimates and calculations.

¹ Fiscal year. In real terms (adjusted using GDP deflator), 2015 base year.

² Policy scenario 1 assumes permanent increase in public consumption. Policy scenario 2 assumes increase in public investment and debt consolidation.

Figure 3b. Dominica: Low CBI Scenario
(In million EC\$)^{1,2}



Source: Country Authorities; and IMF staff estimates and calculations.

¹ Fiscal year. In real terms (adjusted using GDP deflator), 2015 base year.

² Policy scenario 1 assumes permanent increase in public consumption. Policy scenario 2 assumes increase in public investment and debt consolidation.

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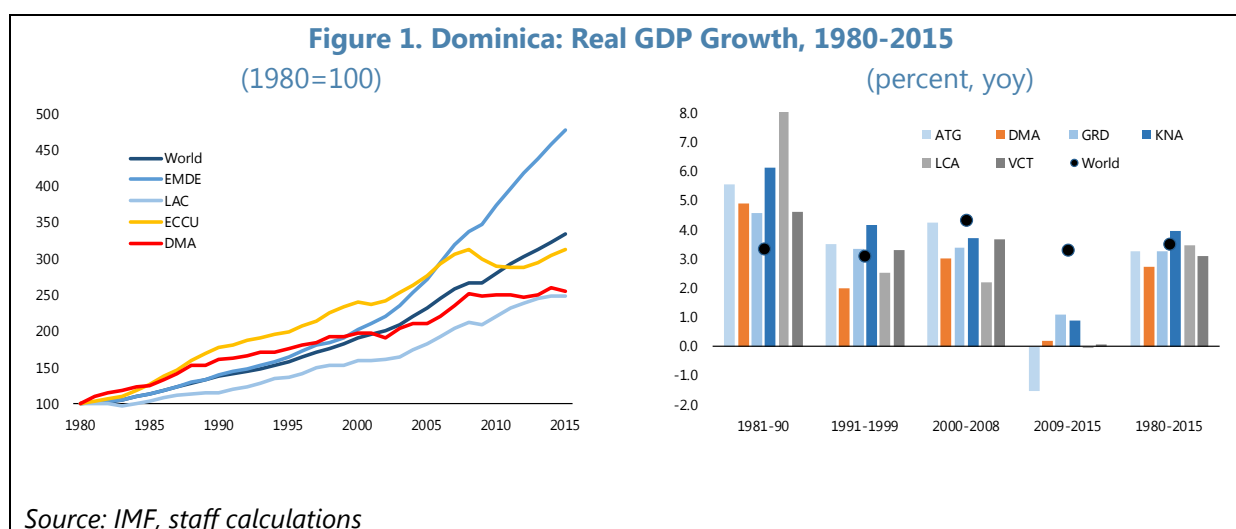
Xu, Xin; El-Ashram, Ahmed; Gold, Judith; Too Much of a Good Thing? Prudent Management of Inflows under Economic Citizenship Programs, IMF Working Paper 15/93.

PRODUCTIVITY AND POTENTIAL OUTPUT IN DOMINICA

This paper analyzes productivity in Dominica by exploring two complementary exercises. First, the paper analyzes total factor productivity (TFP) based on a growth accounting framework. The proposed framework in this paper extends the existing literature by accounting for the impact on natural disasters (NDs) on the stock and productivity of physical capital. It also accounts for human capital accumulation as well as the impact of out-migration on labor and human capital. Second, the paper analyzes labor productivity, including across economic sectors. The results indicate that the historical deceleration in growth was mostly driven by the declining contribution of TFP, resulting in low growth in the aftermath of the Global Financial Crisis (GFC). Labor productivity measures show that labor is largely allocated in the sectors with relatively lower productivity. A simulation exercise indicates that a continuation of these trends would imply a potential output growth of less than 2 percent per year.

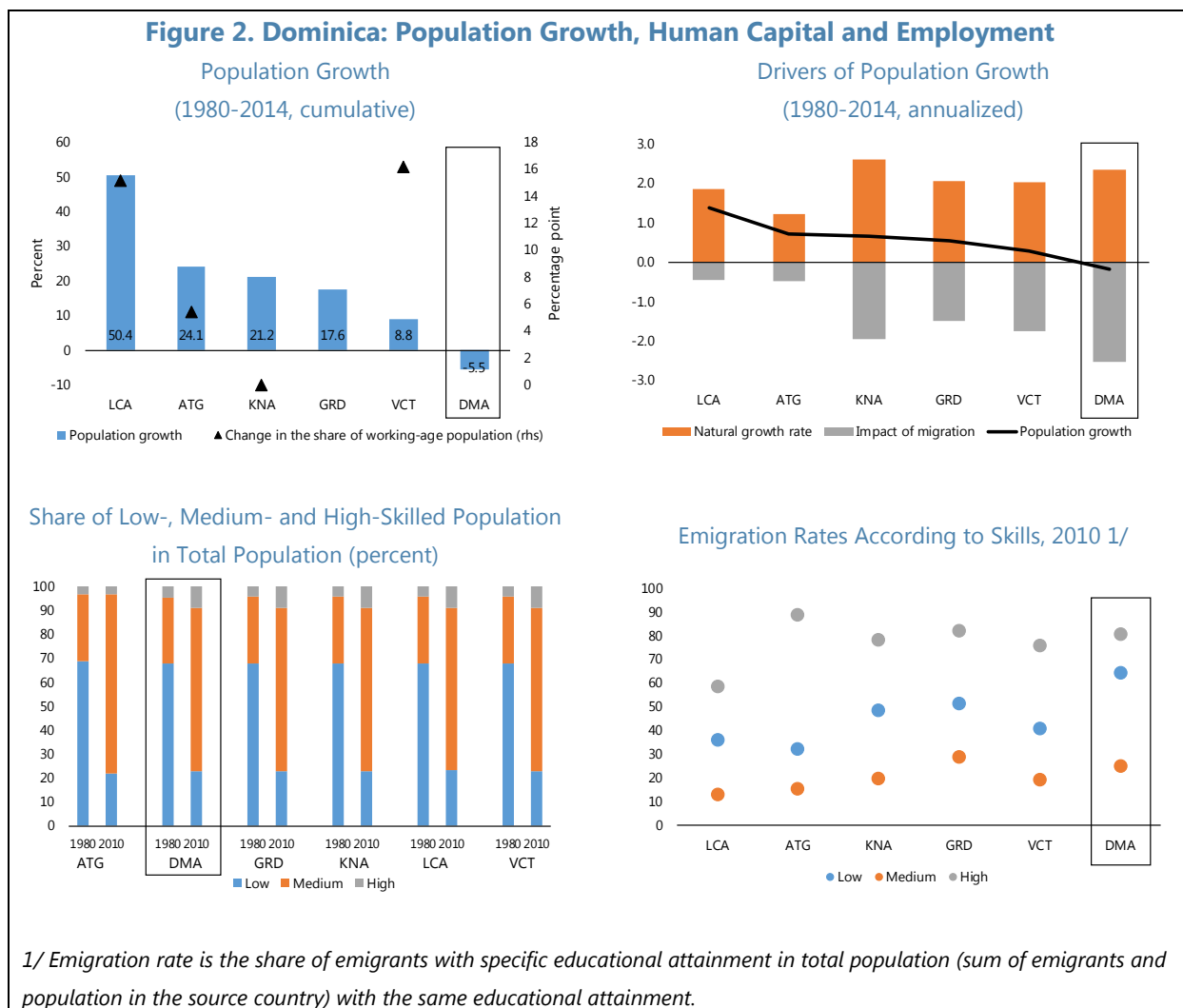
A. Historical Trends in Output and Factors of Production

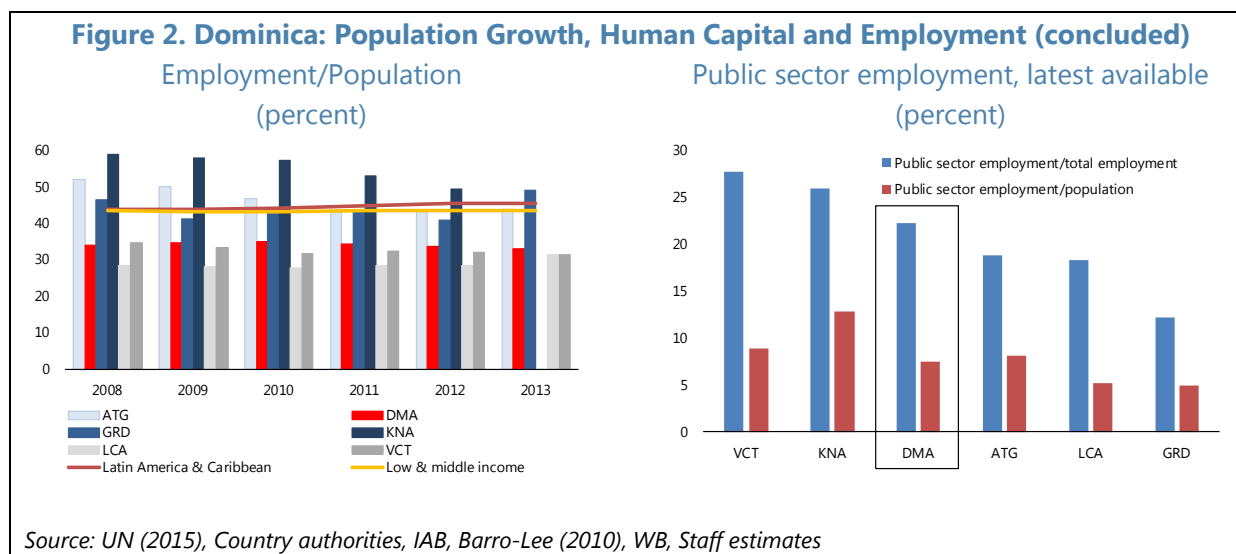
1. Output growth in Dominica was lagging behind growth in emerging markets and developing economies (EMDE) in the last four decades. The economy in Dominica has been growing at an annualized rate of 2.7 percent since 1980, well below 3.3 percent in the ECCU and 4.5 percent in EMDEs but broadly in line with 2.7 percent in Latin America and the Caribbean (LAC). Although Dominica and the rest of the ECCU had broadly similar growth performance in the 1980s, with growth exceeding 5 percent, the country's divergence from the rest of the region and EMDEs started at the beginning of the 1990s and intensified in the aftermath of the GFC (Figure 1). Indeed, economic activity has been stagnating in Dominica since the start of the GFC. This stands in sharp contrast with growth of 5.3 percent in the world and 10.6 percent in EMDEs over the same period.



2. Labor contribution to growth has been low as a result of significant outward migration, which explains a significant portion of the growth gap vis-à-vis regional peers.

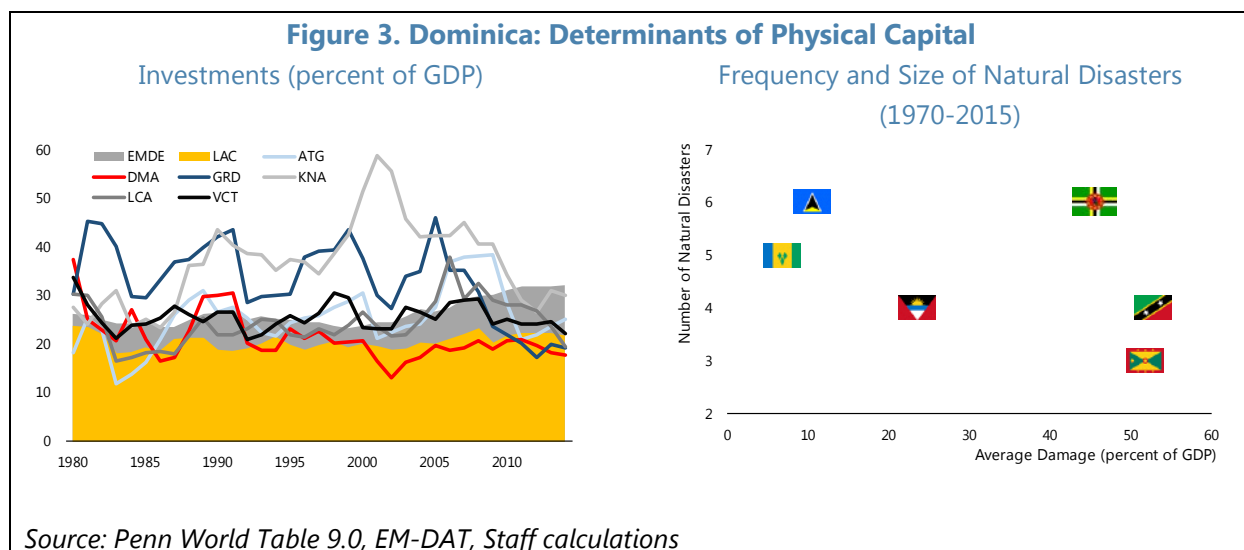
While population in Dominica decreased between 1980 and 2014, it increased significantly in other ECCU countries (Figure 2). This was mostly driven by sizable outward migration. Indeed, while the natural rate of population growth in Dominica is among the highest in the ECCU (around 2 percent per year), outward migration turned population growth into negative territory. These trends were partially compensated by an increase in human capital as reflected in the increasing average educational attainment of the population. However, outward migration included a high proportion of the more educated (high-skilled emigration rate of 80 percent in Dominica), further reducing growth. The weak trends in employment have also been a drag on growth. The employment-to-population ratio is around 30 percent in Dominica that is among the lowest in the ECCU and well below 45 percent in LAC and low- and middle-income countries. Moreover, public sector employment accounts for around 20 percent of total employment in Dominica.





3. Physical capital accumulation has been lowered by regional specific factors, including NDs. The investment-to-GDP ratio in Dominica was around 22 percent on average between 1970-2014 that is the lowest in the ECCU and appears relatively low in international comparison (Figure 3). In addition, various reasons suggest that the return in terms of output of these investments may not be as high as in other countries. First, capital accumulation has been affected by NDs and inclement weather. Indeed, Dominica is among the most exposed countries to NDs in the region, with six major NDs between 1970 and 2015 and an average damage of 46 percent of GDP. This does not only imply faster depreciation and at times the destruction of the existing capital stock, but it also causes inefficiencies in investment as the completion of existing projects often needs to be postponed, rescheduled or abandoned to allow space for rehabilitation and reconstruction projects. Second, the high level of public debt recurrently forces countries into fiscal and financing constraints that often result in the adjustment of public investment, while also absorbing domestic savings, and in some cases increase country risk premia and interest rates, thus crowding out private investment.¹ In addition, investments in the Caribbean are typically driven by public investments and foreign direct investments that have relatively modest multiplier effects on private domestic investments (Roache 2006). Finally, capacity constraints in public administration also affect the execution and financing of investments.

¹ For example, Benson and Clay (2004) note that the NDs in 1979-80 forced Dominica into a structural adjustment program, arguably lowering the space for investment financing by both public and private sectors. They also suggested that the scale of losses and reconstruction funds created an opportunity to replace and update infrastructure, potentially increasing productivity.



B. Measuring Productivity Trends

4. This section computes productivity in the ECCU based on two methodologies: growth decomposition exercise and average labor productivity indicators. First, the growth decomposition exercise is applied with the treatment of NDs to account for their impact on capital stock and its productivity. Second, the calculation of average labor productivity is applied to economic sub-sectors, which provides further insights about underlying forces driving productivity.

Total Factor Productivity

Methodology

5. In order to understand developments in TFP and its impact on growth, a growth accounting framework is applied. The starting point is a standard Cobb-Douglas production function:

$$Y_t = A_t K_t^\alpha (L_t h_t)^{(1-\alpha)},$$

where Y_t , A_t , K_t , L_t and h_t stand for real GDP, TFP, physical capital, labor and human capital, respectively, while α is the share of capital and is fixed at 0.35².

6. The methodology used for the calculation of physical capital accumulation accounts for the impact of NDs. Traditional methods do not adjust for the impact of NDs on physical capital. In the case of the ECCU countries, this would lead to the overestimation of the growth contribution of physical capital. This is because the reconstruction and rehabilitation of damaged infrastructure are included in total investments, but the damage and destruction caused by NDs are omitted. Therefore, Thacker et al. (2012) applied the direct deduction from physical capital stock of the estimated damage of each ND event. This method, however, leads to a large negative contribution

² See Gollin (2002).

of physical capital in years of NDs as the observed decline in output is typically not commensurate to the estimated size of damage. Specifically, even in the case of sizable damages to infrastructure, roads and other infrastructure might still be available for use, even at a lower efficiency level or at higher costs, thereby resulting in a decline in economic activity that is smaller than the one implied by an outright destruction of capital.³ This disproportionality between damage and decline in output leads to the third method proposed in this paper. Specifically, physical capital is adjusted by a factor that addresses an efficiency loss associated with NDs. We thus modify the Cobb-Douglas production function in the following way:

$$Y_t = A_t(\theta_t K_t)^\alpha (L_t h_t)^{(1-\alpha)},$$

where θ_t measures the efficiency of the use of physical capital stock and is estimated as follows:

- Step 1: calculate investment excluding the impact of NDs (\tilde{I}), based on ARIMA estimations;
- Step 2: calculate physical capital stock excluding the impact of NDs (\tilde{K}): $\tilde{K}_{t+1} = \tilde{K}_t(1 - \delta) + \tilde{I}_t$;⁴
- Step 3: calculate real GDP excluding the impact of NDs (\tilde{Y}), based on ARIMA estimations;⁵
- Step 4: calculate TFP excluding the impact of NDs (\tilde{A}) using \tilde{K} and \tilde{Y} as follows: $\tilde{A}_t = \tilde{Y}_t / (\tilde{K}_t^\alpha (L_t h_t)^{(1-\alpha)})$;
- Step 5: calculate θ_t as $\theta_t = Y_t / (\tilde{A}_t \tilde{K}_t^\alpha (L_t h_t)^{(1-\alpha)})$ in years of NDs that converges to 1 over two years following NDs.

7. In order to capture improvements in the quality of labor, we also estimate human capital accumulation. Specifically, human capital is calculated as follows:

$$h = \exp\left(\frac{\theta}{1-\omega} s^{1-\omega}\right),$$

where s stands for years of schooling of the population aged 24 or older, while $\theta = 0.32$ and $\omega = 0.58$ following Bils and Klenow (2000) and Sosa et al. (2013).⁶ Given that average years of schooling was not available for the ECCU countries, we estimated it in three steps. First, we estimated the skill composition of the population using the skill-specific emigration rates and number of migrants from

³ For example, while damage was estimated at 64 percent of GDP (with total damages and losses of 96 percent of GDP) following Tropical Storm Erika in 2015 in Dominica, the decline in real GDP was 1.8 percent.

⁴ The initial level of physical capital stock is calculated as $K_0 = \frac{I_0}{\theta + \delta}$. The initial level of investments (I_0) and real GDP growth (r) are calculated as the average level of investments and growth, respectively, during the first decade of the sample (1970-80), while the amortization rate (δ) is fixed at 6 percent. Data on investments are from the Penn World Table 9.0 (Feenstra et al., 2015).

⁵ Hochrainer (2009) also estimated an ARIMA to compare counterfactual (i.e., no ND) and actual GDP. He showed that NDs have significant negative effects on GDP.

⁶ Population data are from UN (2015).

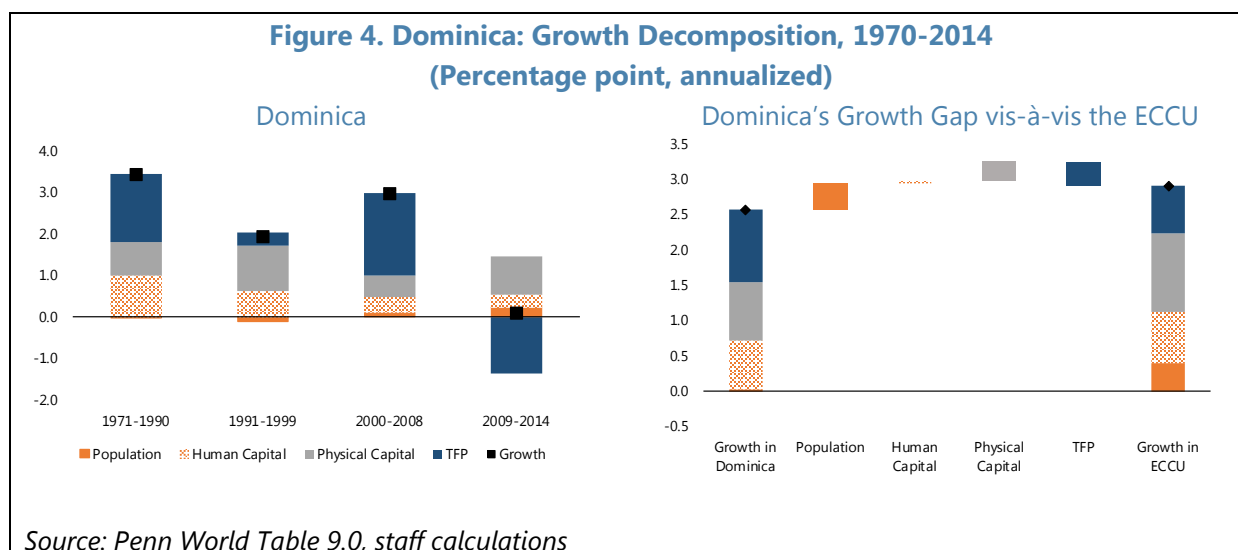
the IAB database and population data in the UN (2015) database. Second, we regressed the average years of schooling on the share of low-, medium- and high-skilled people in total population in the Barro-Lee (2010) database. Third, we estimated the average years of schooling based on the estimated skill composition from step 1 and the estimated coefficients from step 2.

8. Changes in TFP are calculated on a residual basis. It is thus important to keep in mind that any measurement error of labor and physical capital is taken up by TFP as the latter is calculated on a residual basis. Given actual data on real GDP growth as well as estimated labor growth and physical and human capital accumulation, TFP growth is calculated as follows:

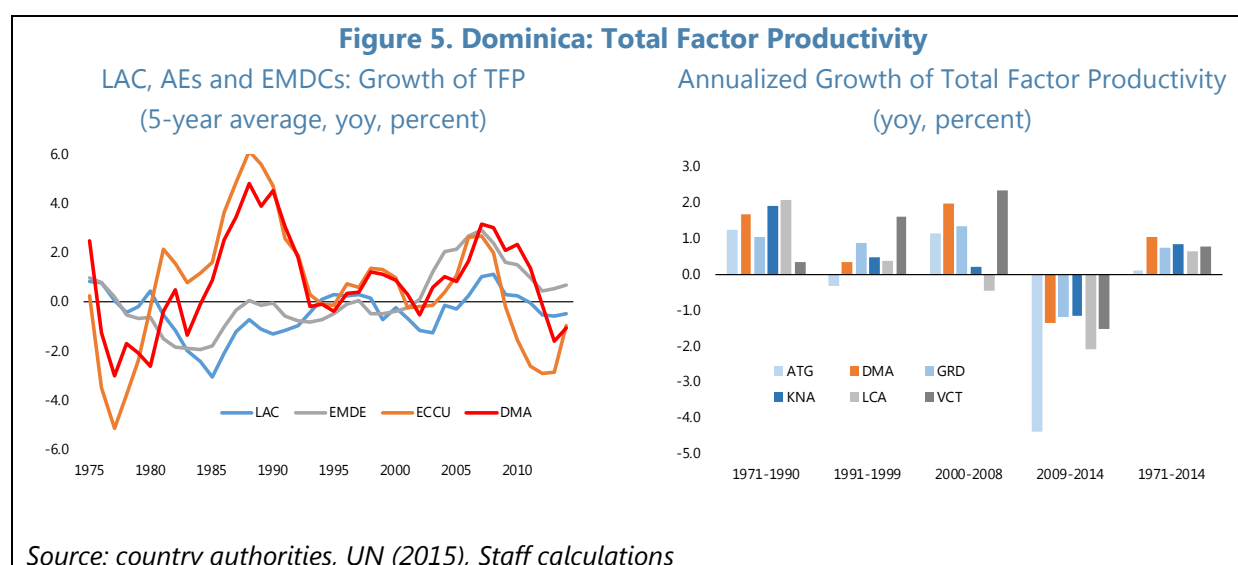
$$\dot{A}_t = \dot{Y}_t - \alpha \dot{K}_t - (1 - \alpha) \dot{L}_t - (1 - \alpha) \dot{h}_t.$$

Results

9. TFP was a main driver behind historical episodes of high growth as well as behind the recent period of stagnation in Dominica. In line with developments in economic activity, TFP showed high volatility over time (Figure 4). However, two periods stand out when TFP had a consistently positive contribution to growth (around 2 percentage point) in Dominica, namely the 1980s and the pre-GFC period. On the other hand, TFP growth turned negative at the onset of the GFC, constraining growth in the last few years. As regards factors of production, even despite significant NDs, physical capital accumulation had continuously positive contribution to growth, albeit to varying extent across periods. As a result of the continuous improvement in the average educational attainment of the population, human capital accumulation also had a positive but declining contribution to growth. Given the sizable outward migration, the contribution of population to growth was close to zero in every period in Dominica.



10. The growth contribution of TFP has been continuously declining and turned negative at the onset of the GFC.⁷ TFP growth has been continuously decelerating since the beginning of the 1980s, except for a temporary uptick in the pre-GFC period (2000-2008) (Figure 5). The latter is assumed to simply reflect accelerating growth, mostly driven by favorable external developments as indicated by increasing TFP growth in EMDEs and LAC. As Thacker et al. (2012) noted, the long-term decline in TFP could be related to the transition from labor intensive agricultural sector to more capital intensive tourism sector. In addition to these long-term changes, however, structural weaknesses should also account for the declining growth contribution of TFP, especially in the post-GFC period when TFP growth became negative. These patterns have been broadly in line with developments in the rest of the ECCU over the long term; however, Dominica had experienced slightly stronger TFP growth than most countries in the region.



Labor Productivity

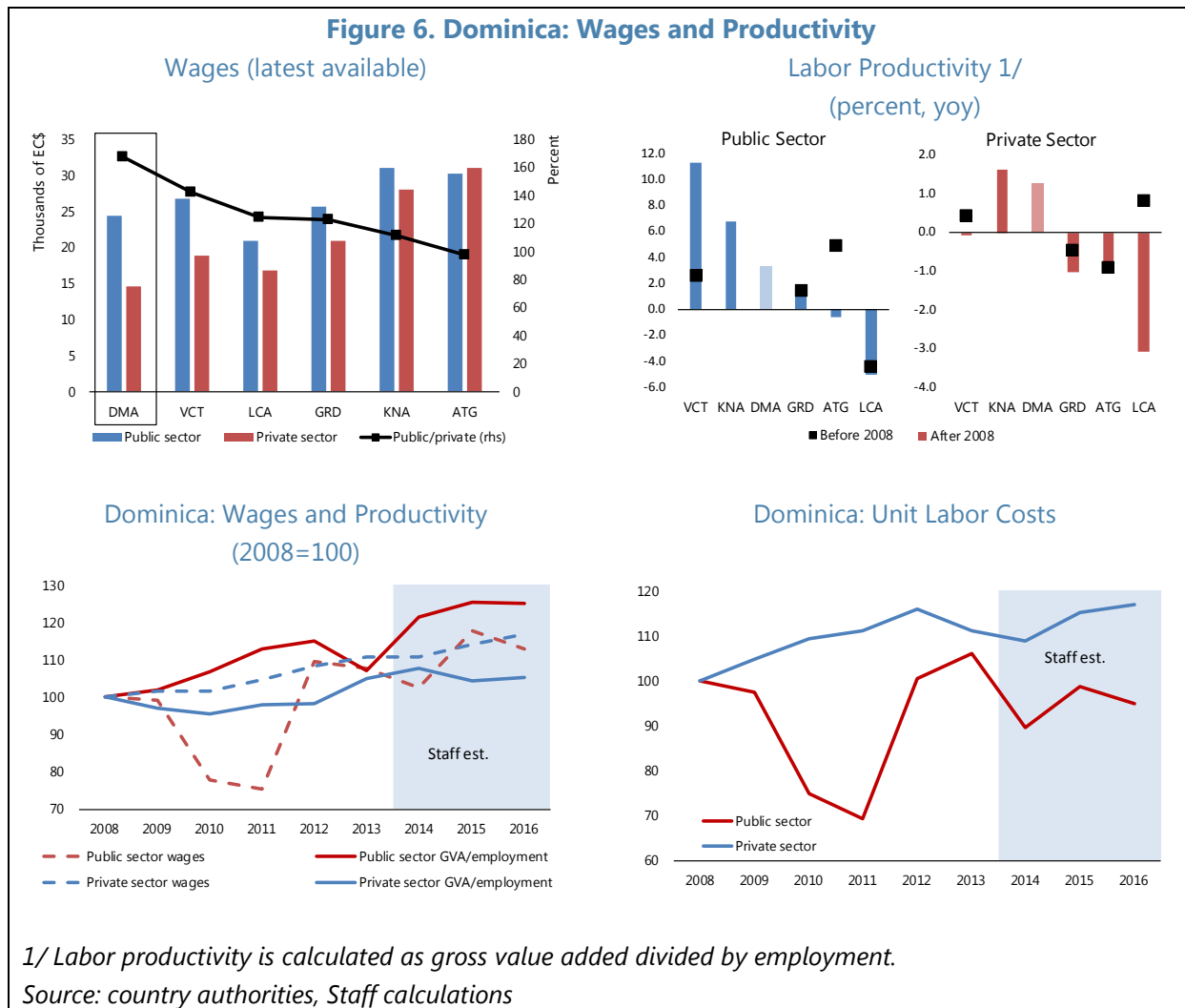
11. This subsection presents labor productivity trends that can be measured more directly and can be used to complement the understanding of the drivers behind low TFP growth.

Labor productivity indicators can complement the analysis on productivity trends from a different angle, and could be informative to explain negative productivity growth estimates in the previous section.

12. Wage growth seems disconnected from labor productivity growth. Most countries show a significant differential between public and private sector wages, with the difference being the highest in Dominica (70 percent), that does not appear to reflect differences in labor productivity (output per worker) (Figure 6). This wage differential can put pressure on wages in the private sector, increasing production costs and reducing investment. In addition, unit labor costs in the private

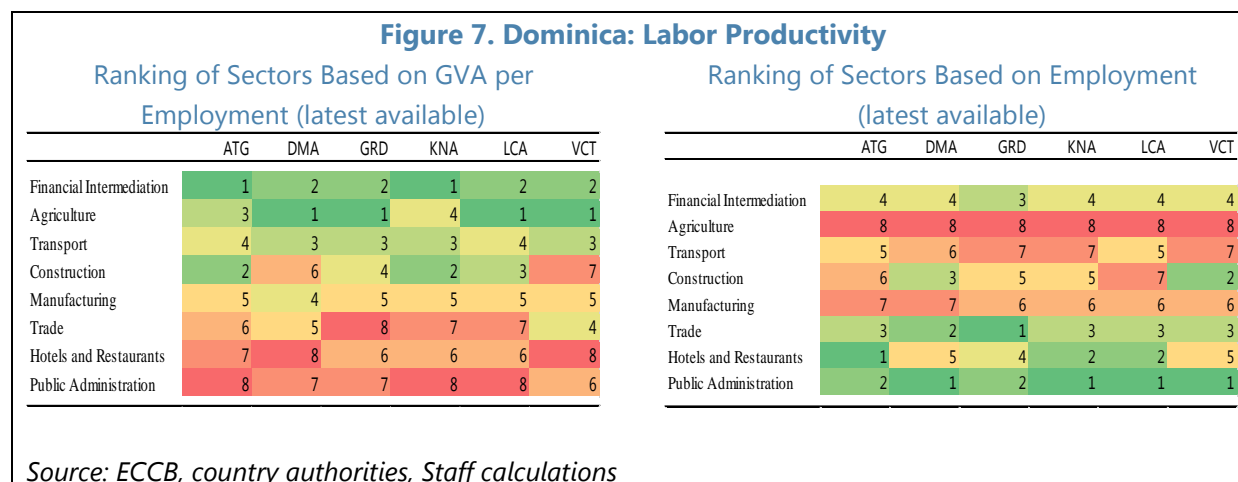
⁷ Thacker et al. (2012) also found that the slowdown in growth is due to a decline in productivity. Daude and Fernandez-Arias (2010) showed that TFP is the main factor behind the stagnation of LAC relative to other developing countries.

sector show an increasing trend in Dominica, meaning that the growth rate of wages has been higher than that of output per worker. As a result, the negative combined contribution of physical capital and TFP since the GFC, as shown in the previous section, imply that these increasing trends cannot be backed up by growth in labor productivity.



13. The disconnect between wages and labor productivity can explain the high employment in relatively less productive sectors. This observation is consistent with the hypothesis that labor allocation is not determined by productivity gaps across sectors, but by other factors such as unionization, higher bargaining power or other labor market rigidities and frictions that prevent labor mobility or adaptability. While financial intermediation, agriculture and transport are the most productive sectors in Dominica in terms of gross value added (GVA) per employee,

they account for only 15 percent of total employment (Figure 7).⁸ On the other hand, public administration, which is among the least labor productive sectors, employs 25 percent of total employees. Hotels and restaurants, one of the main drivers of economic activity, are also lagging behind other sectors in terms of labor productivity.



C. Conclusion: Potential Output Implications

14. The growth decomposition and labor productivity analysis provides a useful platform to propose plausible potential output growth scenarios. This can be done by inspecting the main sources of growth during the historical sample period, and proposing conjectural alternatives about the evolution of the factors of production and TFP that are commensurate to plausible foreseeable developments. It also permits an evaluation of the factor and productivity requirements in order to accelerate potential growth, which could prove useful to inform economic policies. For the calculation of potential output, we thus estimate trend series for TFP and physical capital (A_t , K_t), using the Hodrick-Prescott, Baxter-King and Christiano-Fitzgerald filters^{9,10}. For the period 2016-21, we assume that human capital is growing at its average growth rate between 2006-10, while the growth rate of labor is expected to equal population growth projected by the UN (2015).

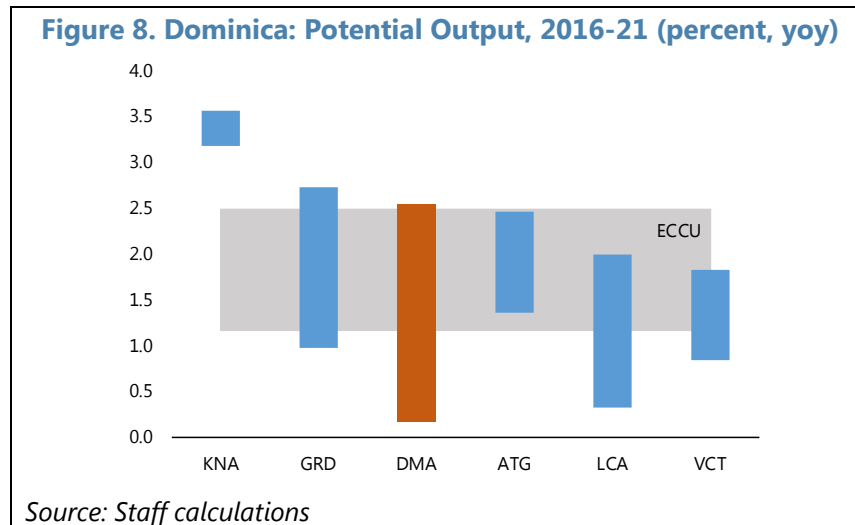
15. The results above indicate that, without meaningful policy changes that affect investment and labor allocation, potential growth will remain disappointing. Potential output growth is estimated to be in the range of 0.2-2.6 percent in Dominica, slightly below 1.5-2.5 percent in the ECCU (Figure 8). Should post-GFC trends in TFP continue, growth would be closer to the lower

⁸ These results should be interpreted with caution, as some of these sectors may underreport employment and rely on informal hiring practices. For example, given the anecdotal information about the size of the black economy in agriculture, employment in agriculture is likely to be underreported, and thus GVA per employee substantially overestimated.

⁹ Following Sosa et al. (2013).

¹⁰ We consider two scenarios for 2016-21. First, both are assumed to grow at the same rate as in the aftermath of the GFC. Second, we also estimate potential output assuming that TFP and physical capital accumulation return to the long-term historical growth rate.

end of the range. Labor market policies that can influence migration and labor allocation across sectors could be a key to improve potential growth. For example, addressing the constraints on factor mobility across sectors, possibly including skill mismatches and/or education and training policies that facilitate labor adaptability, could further contribute to potential growth. In addition, decisions on public wage increases should also be mindful of their impact on the broad economy, in particular on investment in other sectors. Investment and the enactment of regulations that ensure the resilience of public and private infrastructure to NDs would also have a positive contribution, including also by increasing investment levels.



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MACROECONOMIC AND DISTRIBUTIONAL IMPLICATIONS OF FISCAL CONSOLIDATION: AN APPLICATION TO DOMINICA

Dominica is undertaking a process of fiscal consolidation, as needed to reach the committed regional public debt target of 60 percent of GDP by 2030. But it also faces structural challenges and development needs, including low growth and poor competitiveness, and also as it is in need for significant reconstruction expenditures after being affected by tropical storm Erika in August 2015, with losses and damages of 96 percent of GDP. This paper presents a dynamic stochastic general equilibrium model developed specifically for small states, which is calibrated to Dominica and used to explore alternative fiscal policy instruments to achieve fiscal consolidation. It shows that the choice of instruments is critical to minimize the impact on output, wages, and inequality.

A. Introduction

1. This paper analyzes macroeconomic and income distribution implications of different fiscal policy instruments for fiscal consolidation in Dominica. The model has been designed to capture key features of a small state economy such as Dominica.¹ It includes a fairly granular arrange of government revenue and expendityure options that can be used for detailed fiscal policy experiments, such as taxes on consumption, wages, and profits, and also non tax revenues –which can be tailored to capture level and volatility of grants and citizenship by investment program. It also features detailed expenditure allocations, including in public wages, public investment in human capital (mainly health and education) and in infrastructure, and transfers to the different types of households (including with skilled and unskilled labor endowments, which can be treated as targeted or as general transfers). The model allows to assess the effects of these policies after accounting for the behavioral responses of households and firms on key macroeconomic indicators, including output, wages, and profits, across the different sectors.

2. The model captures key features of small states such as Dominica. Output is subject to natural disaster shocks. Also, workers can opt to migrate and send remittances back to the resident households, which is another key feature typical of small states. The model also allows the representation of formal and informal labor markets, the later taking the form of an informal service sector. A formal service sector includes a tradable output, which captures another key feature of small states which often display large tourism and/or financial services sectors for export.

3. Another important feature of the model is that manufacturing goods are imported for consumption and, very importantly, also for investment purposes. This is a key model feature for small and undiversified states such as Dominica: output is dependent on imported capital, and

¹ Similar analysis that jointly considers macro and distributional issues has been applied to many countries in the context of the Article IV consultations. A recent paper by Fabrizio et al (2017) summarizes previous case studies.

thus external competitiveness is key to ensure not only the sustainability of consumption of imported goods, but also to facilitate investment in output for export, which is key for sustainable growth and employment given the small size of domestic demand.

4. Finally, the model allows the calculation of the impact of shocks and economic policies on income distribution. The model combines elements of the structural transformation literature², growth accounting³, and sovereign debt in a small open economy⁴.

5. The model is calibrated to the Dominica economy and used to analyze different fiscal consolidation instruments, which can inform policies to meet the regional debt target. The government has committed to reach the regional debt target of 60 percent of GDP by 2030, which will require a fiscal consolidation effort going forward. In addition, given the significant uncertainty and unpredictability of key sources of revenue such as grants and Citizenship by Investment, the analysis could be used to better inform decisions on the preparation of contingency fiscal measures.

6. The paper proceeds with four sections. Section B presents a description of the model.⁵ Section C displays the calibrated parameters to match key moments of the Dominica economy. Section D presents the results on the macroeconomic and distributional implications of a fiscal consolidation of 1 percent of GDP using four alternative fiscal policy instruments: (i) value-added taxes, (ii) corporate taxes, (iii) government consumption (wages and general transfers), and (iv) public investment. Section E concludes.

B. Stylized Model Description

7. The model set up presents a small open economy with three consumption goods: agriculture, manufacturing, and services. There are five types of households: unskilled, skilled, government employees, entrepreneurs, and farmers. Households solve dynamic optimization problems taking prices and government policies as given. In addition to the consumption decision, the different participants of the economy make decisions that affect output and incomes:

- Unskilled households - choose to work for farmers or in the informal sector.
- Skilled households - choose to work for entrepreneurs or to migrate.
- Government Workers - choose to work for the government or to migrate.
- Farmers - hire labor to the agriculture sector and invest.
- Entrepreneurs - hire labor for the formal manufacturing and service sectors and invest.

8. Three goods are produced: (i) agriculture (produced by farmers), (ii) manufacturing (produced by entrepreneurs), (iii) services (produced by entrepreneurs, mainly banks and tourism, and also by unskilled workers in the informal sector). Services are produced by both the formal and

² See Herrendorf et al (2014).

³ See Kehoe and Prescott (2007).

⁴ See Uribe and Schmitt-Grohé (2012).

⁵ A more technical presentation will be presented in a forthcoming IMF Working Paper series.

informal sectors. Both sectors use labor as main input. However, the formal sector uses skilled labor while the informal sector uses unskilled labor. The model features agriculture and manufacturing sectors. The agriculture sector employs mostly unskilled labor to produce agricultural goods (an important sector in Dominica in terms of output and employment). The output of agriculture and manufacturing are sold domestically or internationally.

9. The government sector includes a granular menu of fiscal policy instruments. The government collects tax revenue (value-added taxes, corporate taxes, and personal income tax) and nontax-revenue (mainly citizenship by investment program and donor grants). Government revenue is used to fund government expenditures (including public sector wages, public investment and transfers) and to service public debt. These decisions ultimately affect the government balance and the accumulation of public debt. The model structure is summarized in Table 1.

Good	Producer	Input	Use	Commerce
Agriculture	Farmers	Unskilled Labor and Capital	Consumption	Tradable
Manufacturing	Entrepreneurs	Skilled Labor and Capital	Consumption and Investment	Tradable
Services	Unskilled Labor and Entrepreneur	Labor	Consumption	Non-Tradable
Public Goods	Government	Public Workers and Manufacturing Goods	Infrastructure, Education, and Social Transfers	Non-Tradable

Source: Fund staff

10. The inclusion of nontax revenues is an important feature of the model for the Dominica case, as it captures CBI and donor grants. The importance of nontax revenues has increased significantly in recent years, due to the expansion of the CBI program (central government revenues are estimated at over 9 percent of GDP in 2016-17). The government also received grants and aid. The model parameters are calibrated to replicate these key features of the Dominican economy.

11. The possibility of labor migration is another key feature of the model, with important macroeconomic implications. The model allows households to choose between working in Dominica, or moving to other countries, in which case they send back remittances. Notice that this is macro critical for Dominica. Outward migration had a significant impact on both the quantity and quality of labor over the last four decades. In particular, Dominica is the only country in the ECCU with negative population growth, even though it has one of the highest natural growth rate of population. Moreover, the emigration rate is more prominent for high-skilled workers, reaching 80

percent of its population. These skilled workers contribute to the economy by sending remittances, of around 5 percent of GDP per year. In order to take these into account, the model allows that policy changes affect workers' decision of migrate.

C. Calibration of the Model to the Dominica Economy

12. The model is calibrated to match the quantitative parameters of the Dominica economy. The calibration resembles not only sector sizes, use of labor and capital, and inter-sector linkages, but it also captures the distribution of income.⁶ The sizes of the sectors in the model are calibrated from National Accounts data, also mapping the sectors in the model to those of the Dominica economy. In particular, services play an important role in Dominica, accounting for 51 percent of output. Details on the specific calibration parameters are shown in Annex I (Table A1 summarizes the moments and the model performance). Labor market parameters, including labor force and its distribution across the different sectors in the model, are based on data from the Dominica Social Security Administration. Migration has been calibrated to match the share of the Dominican population working in foreign countries. Remittance flows are also modeled to match the data.

13. Preferences are calibrated from consumption shares in the consumer price index basket, mapping the different types of goods consumed to the sectors in the model.

14. Government revenue and expenditure parameters are calibrated to central government data, with tax rates calibrated to effective revenue collections. Non-tax revenues are calibrated to match flows mainly from the CBI program and grants.

D. Results: The Fiscal Consolidation Instrument Matters

15. The model is used to perform four fiscal policy experiments, each consisting of a consolidation of 1 percent of GDP using a specific instrument. The four instruments are follows: (i) value-added taxes, (ii) corporate taxes, (iii) government current spending, and (iv) public investment. In each experiment, it is assumed that yields are used to repay government debt. These four experiments are designed to offer a broad sense of the implications of choosing different instruments for fiscal consolidation with very different implications on the economy: two tax revenue instruments (on consumption and on investment returns), and two expenditure instruments (consolidation of government consumption and public investment). For each instrument, Figure A1 presents the impact on key macroeconomic indicators relative to the case of no policy change. Figure A2 presents the impact on income distribution and inequality.

16. These four experiments do not exhaust the number of policy experiments that could potentially be explored with the model. The four experiments mentioned above are chosen as broad indicators of the most notable implications of the type of policy instrument chosen for fiscal

⁶ As there is very limited information on the income distribution in Dominica, we use data from the social security to match the distribution of skilled, unskilled, and government workers in the economy.

consolidation. Also, the amount of fiscal consolidation of 1 percent of GDP is chosen for illustrative purposes, and to make the results comparable across the four different experiments. Other policies could be explored, such as targeted reduction in transfers to protect the poor households; reduction in public investment in human capital; and combinations of the different revenue and expenditure instruments.

Value-Added Tax

17. An increase in value-added taxes generates a decline in economic activity. The increase in value-added taxes raises the prices of consumption goods, reducing aggregate demand and output. Investment also decreases, because the increase in the value-added taxes reduces the disposable income of households in the economy, including entrepreneurs and farmers that adjust their savings and investment.

18. The increase in value-added taxes reduces income inequality mainly through the increase in the wage of unskilled workers. By reducing aggregate demand, the increase in value-added taxes leads to a reduction in the relative prices of non-tradable goods to tradable goods. This change in relative prices stimulates exports, mainly that of agricultural commodities, thereby increasing the demand for unskilled labor and their wages, ultimately also reducing income inequality.

Corporate Taxes

19. Increasing corporate taxes reduces private investment and output. An increase in corporate taxes reduces the return of private investment in the economy. The resulting lower level of investment decreases economic activity and consequently growth.

20. All households are worse-off after an increase in corporate taxes. As the increase in corporate taxes reduces investment, the demand for workers decreases, resulting in a decline in wages. The relatively higher income households, namely entrepreneurs and formal sector (“large”) farmers, are directly affected, because they own firms and farms and thus pay corporate taxes. As a result, inequality decreases. However, each household in the economy, except for public service workers, is worse-off.

Government Consumption

21. A proportional reduction of public sector wages and general (non-targeted) transfers leads to a better allocation of resources and consequently higher output. The fiscal consolidation through a reduction in current government spending enhances efficiency. As a result, output increases in the long term because private wages are better aligned with the marginal product of labor.

22. The reduction of government general transfers leads to higher inequality, highlighting the importance of a well targeted social assistance program. Reducing government transfers to all households leads to higher income inequality, because transfers are a larger share of poor

households' income. This is displayed in the results presented in the charts in Annex 2. This highlights the importance of a well-targeted transfer consolidation that does not affect the low-income households, thus resulting in a better balance in terms of growth and equity objectives.

Public Investment in Infrastructure

23. Reducing public investment in infrastructure leads to a considerable decrease in output. Under the assumption that investment in infrastructure is efficient, reducing investment in infrastructure leads to a large decrease in total factor productivity across the economy, which reduces the return of private investment and thus generates a large decrease in output. Overall, in the long run, the decrease in economic activity is large, reducing government revenue collection from value-added taxes, corporate taxes, and labor income taxes. The reduction in government revenue more than offsets the savings from lower public investment.

24. All households are worse-off after the reduction in investment in public infrastructure. The decline in public investment reduces the return to private investment and the demand for workers. All households are worse-off, except for public workers whose wage is not affected by labor market developments, a model assumption. Relatively high income households, namely entrepreneurs and large farmers in the formal sector, suffer more than other households because they own capital and the return of capital is more dependent on the stock of public infrastructure. As a result, inequality decreases as the top of the income distribution was affected more than the bottom of the distribution.

E. Conclusions

25. The results highlight key policy tradeoffs between efficiency and inequality. A fiscal consolidation with government consumption is the most efficient fiscal instrument, as measured by its impact on output, but it is also the last equitable among the options analyzed. This is because it includes a consolidation of general transfers, including to poor households, for whom government transfers are a relatively larger share of their income. At the opposite end, a consolidation reducing public investment is the least efficient option, ranking last in terms of its impact on output, but it also has a more measured impact on inequality. The latter is because public infrastructure is most beneficial to relatively higher income investors in the formal sector, who rely relatively more heavily on public capital for production. The latter, however, has an important impact on wages for all households, as it reduces labor and capital productivity. Thus, inequality is not as affected but the income *level* of the relatively poorer households is indeed affected significantly. This result highlights the importance of a well targeted transfer consolidation plan that minimizes the impact on low-income households.

26. Although indirect consumption taxation worsens income distribution, the results also show that corporate taxes can worsen income distribution even more. This is because the later affect wages more than proportionally, given their deeper impact in terms of reducing the productivity of capital and labor. Notice that outward migration further compounds on this effect, as lower investment reduces wages, and thus labor migrates to seek better employment opportunities

abroad, further reducing labor and capital productivity and thus propelling the negative cycle of low wage-low investment.

Policy	Value-Added Taxes	Corporate Taxes	Government Consumption	Public Investment
Output	2	3	1	4
Inequality (Gini)	3	2	4	1

Source: Fund staff calculations

27. The results also highlight the impact on external competitiveness of the different fiscal policy consolidation instruments. This is important given that Dominica's real exchange rate is assessed to be overvalued according to the various methods used by the Fund, and given the regional quasi-currency board monetary arrangement, other options, including a fiscal devaluation, need to be considered. The analysis shows that a fiscal consolidation would result in a depreciation of the real exchange rate, thus improving competitiveness.

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Annex I. Calibration

Table A1. Dominica: Calibration

	Data	Model
Preferences (% of Consumption Expenditure)		
Manufacturing Consumption	0.36	0.36
Service Consumption	0.42	0.42
Production (% of GDP)		
Share of the Agriculture Sector	0.17	0.17
Share of the Service Sector	0.51	0.51
Share of the Informal Sector	0.04	0.04
Share of Remittances	0.10	0.10
Fiscal Policy (% of GDP)		
Revenue		
Value-Added Taxes	0.13	0.13
Corporate Taxes	0.04	0.04
Personal Income Taxes	0.05	0.05
Non-tax Revenue (Citizen Program)	0.10	0.10
Grants	0.05	0.05
Expenditure		
Compensation of Employees	0.11	0.11
Transfers	0.05	0.05
Public Investment	0.03	0.03

Source: Fund staff calculations

Annex II. Macroeconomic Impact of Fiscal Consolidation

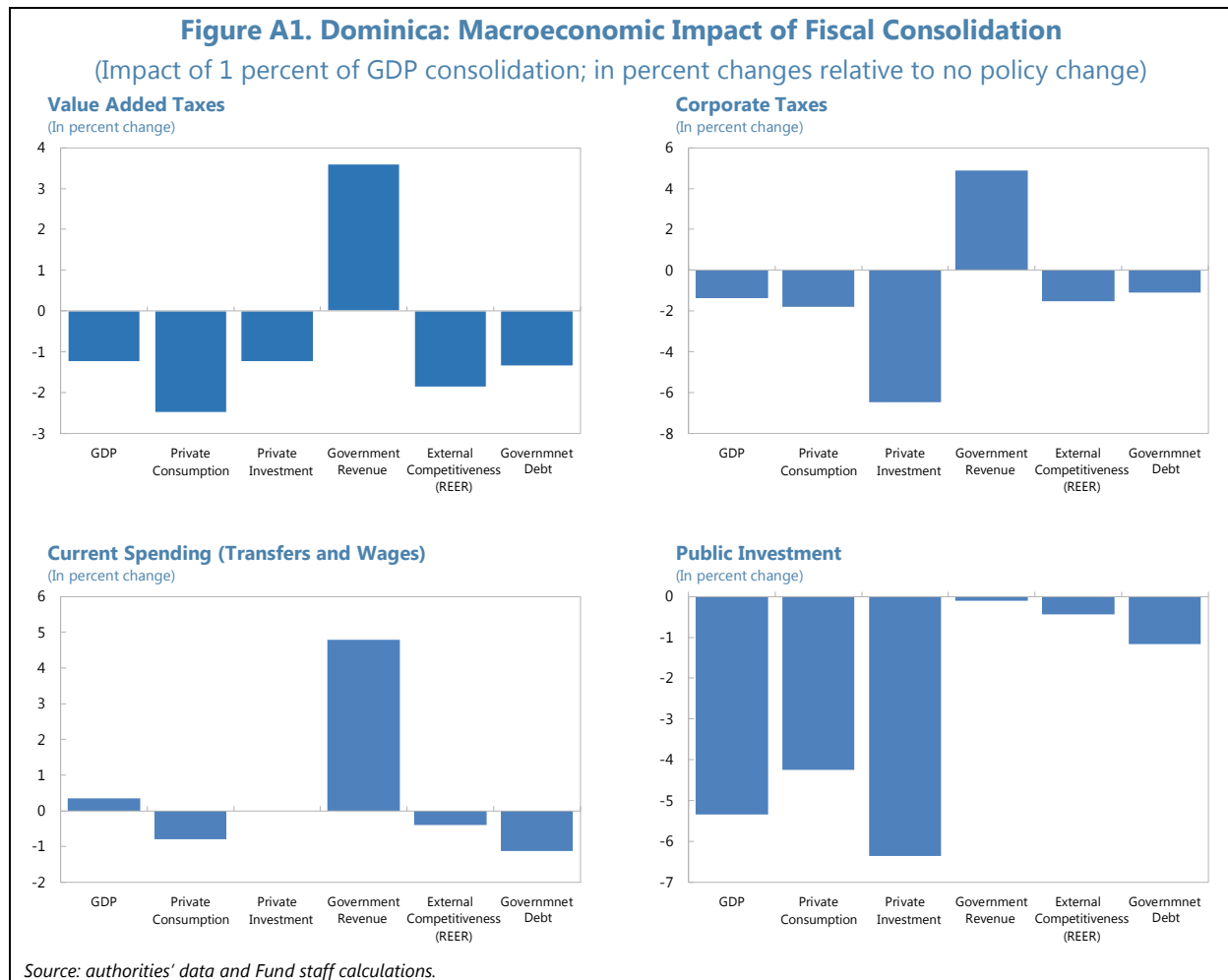
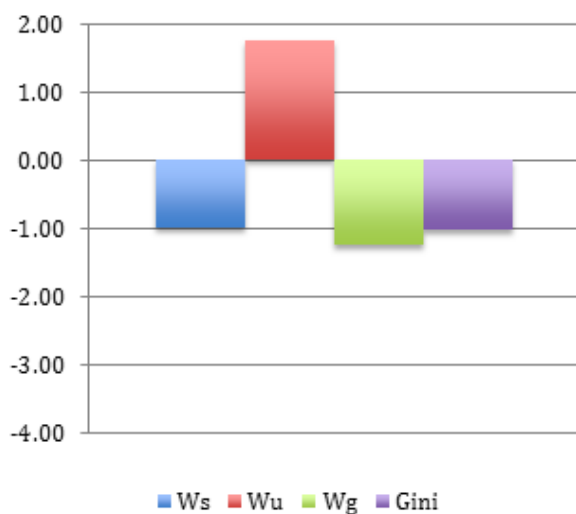
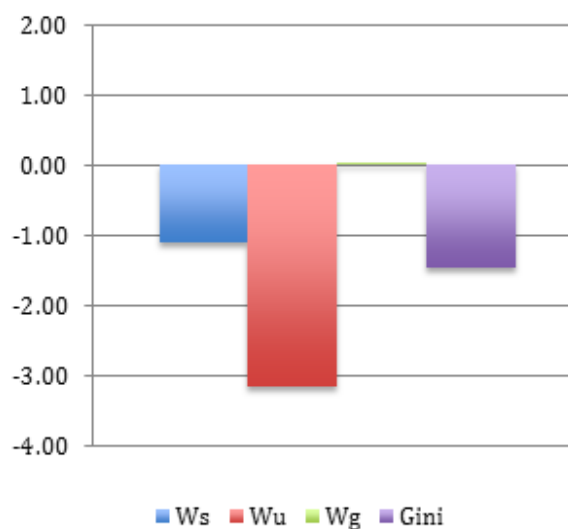


Figure A2. Dominica: The Distributional Impact of Fiscal Consolidation

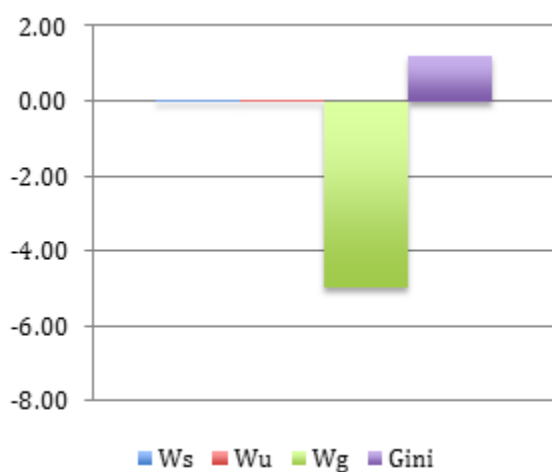
Value Added Taxes



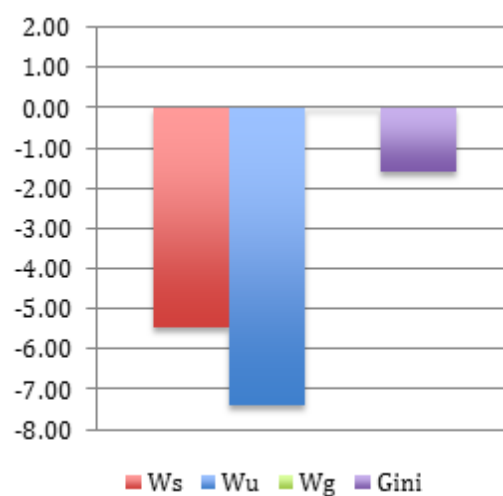
Corporate Taxes



Current Spending (transfers and wages)



Public Investment



Source: Authorities' data and Fund staff calculations.

Ws is wage in the service sector; Wu is wage of unskilled workers; and Wg is government wages.