Estudios Técnicos Inc.
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Economic Impact of the Adoption of a $15.00 Minimum Wage for Construction in Public Projects and of a PLA

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APC Asociación Puertorriqueña del Concreto

MCA Mechanical Contractors Association Since 1960 Puerto Rico

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Highlights

- Economic activity since hurricane Maria has outpaced expectations. This has been fueled by Federal recovery and private insurance compensation funds that have permitted the Commonwealth and its residents to continue with the reconstruction process.
- The construction industry faces external developments in the US labor market that represent potential pressures on the local labor market on the supply and wage components. This presents employment opportunities to local workers, where the median hourly wage for construction and extraction occupations in the sector is $9.02 (comparable states have hourly wages of $13-$14).
- Contractors' costs for materials have escalated considerably so far this year, compared to pre-hurricane María. Two factors have played a key role: the U.S.-imposed steel, lumber and aluminum tariffs on imports from Canada, Mexico, and the European Union, and the pressures on the increasing demand for materials and labor as a result of the reconstruction works after Hurricane Maria. Construction costs have increased about 20-25% due to these factors.
- In addition to Puerto Rico, the stateside contractors competed for recovery initiatives related to Hurricane Maria. As of September 27, 2018, over $4.1 billion dollars were obligated towards Hurricane Maria recovery. Of this amount, Puerto Rico based contractors received around 9.3%, or $385 million, which suggests that local preference provisions in Stafford Act and PR legislation are being disregarded.
- To these challenges one must add the implementation of a $15 minimum wage for construction workers in publicly funded projects. The impact analyses and scenarios reveal the following:
    - ⇒ Due to expected labor shortages, labor cost impacts will spill over to projects not covered under Executive Order 2018-033.
    - ⇒ The overall (for 2017, the fiscal year for which data is available) wage increase in production, non-production and supervisory occupations is expected to range between $114 and $286 million. If the disbursement of federal funds is assumed will last as in the Fiscal Plan (14 years), the wage impact during this period (assuming a 2% inflation rate) would amount between $2.1 and $5.3 billion.

⇒ Of the total impact, 47.2% of the increase is attributable to construction and extraction occupations. The majority of the impact is centered around exempt occupations.

Distribution of Wage Increase by Occupation Group
2017

Occupation Group	Value of Wage Increase in Sector	
	Scenario 1 (Fully Localized)	Scenario 2 (Fully Generalized)
Construction and Extraction Occupations	$53,905,274	$134,763,185
Other Occupations	$37,502,400	$93,756,000
Installation, Maintenance, and Repair Occupations	$14,144,000	$35,360,000
Production Occupations	$3,813,333	$9,533,333
Transportation and Material Moving Occupations	$4,992,000	$12,480,000
Unweighted Total (OES Basis)	**$114,357,008**	**$285,892,519**

Sources: US Bureau of Labor Statistics (2018). *Occupational Employment Survey: Research Estimates by State & Industry*. Estimates by Estudios Técnicos, Inc. (2018).

⇒ The increase in wages will contribute between 8.0 to 20.5 percentage points (pp) to inflation in construction, and from 0.5 to 1.2 pp to overall inflation. PLA's could add up to a further 1 pp to inflation, leading to a total impact of up to **2.2 pp**. A specific case is incorporated in the report where the increase in costs is 30%.

⇒ From 5,042 to 12,604 workers are expected to be impacted by some form of labor displacement due to the structural readjustment within the sector.

⇒ It is expected that a disproportionate share of the impact will fall upon small and medium businesses in Puerto Rico. On average, more than half of the displaced workers currently form part of a small or medium establishment in Puerto Rico.

⇒ The sector may face consolidation, as companies unable to cope with the new requirements may close.

- Due to the significant amount of federal funding allotted to residential reconstruction, it is expected that construction investment will increase considerably in this segment, particularly in light of its collapse since 2006. The impact of the higher wage requirements for this new investment, however, would result in house prices being driven higher.

⇒ Considering that 66.8% of new housing demand is at the $105,000-$199,999 price range, it is possible that new home purchasers may have to settle for substandard units relative to their payment capacity due to the new price points. Many other families will not be able to acquire housing units due to a wider affordability gap as prices increase.

The overall impact of the executive order is that fewer projects will be constructed each year. This will delay reconstruction efforts and negatively impact the economy. Also, capital improvement programs for PROMESA covered entities that depend on operating budgets for their financing, will see an adverse effect on their fiscal plans. This is the case with PRASA, for example.

With respect to private investment, one probable consequence of the EO is that the construction sector will experience difficulties in obtaining skilled workers.

This sudden surge in public funds, combined with the increase in wages, could drown out local private investment with increasing costs, leaving a smaller and weaker private sector when the federal funds eventually run out.

The total amounts of impacts is described in the table below.

- The expected impact of inflation conservatively estimated would be 2.2 percentage points above current inflation trends, 1.2 percentage points of which is due to wage increases, and 1.0 percentage point due to the establishment of the PLA.
- In terms of employment, it is expected that 5,000 to 12,600 workers would be displaced from other activities within or outside the construction sector, due to the new wage structure.
- In the Table below, the minimum annual impact refers only to wage increases of production workers, the maximum annual impact includes the domino effect on other wage and salary levels, which is to be expected. These are estimated on the basis of 2017 BLS data.

Summary of Impacts of the Executive Order, by Measure

Impact	Minimum Impact (Fully Localized)	Maximum Impact (Fully Generalized Within Sector)
Additional Costs to Businesses (1-Year)	**$114,357,008**	**$285,892,519**
Impacts on Inflation	**0.8 pp**	**2.2 pp**
Wage Raise	0.5 pp	1.2 pp
PLA	0.3 pp	1.0 pp
Displaced Workers	**5,042**	**12,604**

1. Introduction

The economic context in which construction activity is now evolving and will continue to do so in the coming five years, is almost unique, in terms of the magnitude of the reconstruction investment needs and challenges. The following key points underline current and prospective developments:

1. Economic activity since hurricane Maria has outpaced expectations. This has been fueled by Federal and private recovery funds that have permitted the Commonwealth and its residents to continue with the reconstruction process. Fiscal year 2019 is expected to close on a positive note, with real GNP growth at 5.3% (Base line). A good look at coincident indicators, such as total employment, unemployment rate, employment rate, construction employment, cement sales, retail sales, net revenues to the General Fund, the PMI for manufacturing, auto sales, have shown since the end of 2017 a positive and upward trend.
2. The government submitted to Congress its Reconstruction Plan, with a price tag of $139.0 billion, of which half is to be financed by the federal funds already assigned or expected to be received, which leaves the balance still pending. That amount is equivalent to twice PR's nominal GNP in fiscal 2017 of $70.6 billion. How realistic it is will be clear in the coming year.
3. On the other hand, Judge Swain sustained the validity of the budget for the government certified by the Fiscal Oversight Board for current fiscal year 2019. The decision is not inconsequential, since that budget, and the future ones that the Fiscal Board will approve, set the tone for the fiscal recuperation of the government.
4. On balance, in the short term the economy is expected to grow, remaining in positive territory, due to federal reconstruction funds. That trend, though, is expected to slow down by fiscal 2022, as the weight of the measures enacted in the certified fiscal plan of June 29 take hold, lower disbursements of federal funds, and underlying structural problems remain unresolved.

The construction industry also faces external developments in the US labor market that represent potential pressures on the local labor market on the supply and wage components. For one, the US economy is almost at full employment, where the demand for labor has increased significantly, exercising an upward push on wages, including the construction sector. This presents employment opportunities to local workers, were the median hourly wage for construction and extraction workers in the sector is $9.02

(comparable states have hourly wages of $13-$14).[1] The industry as a whole, including administrative workers, has an average hourly wage of $11). Also, the reconstruction work that will start as a result of Hurricane Michael in Northwest Florida will create additional demand for construction and energy workers, and impact Puerto Rico's labor market.[2] Thus, the construction sector will have to face these factors that will definitely push up salary demands in order to retain skilled workers. To those one should add the implementation of the $15.00 minimum hourly wage.

1.1. Objective of the report

The objective of this report is to assess the potential economic impacts of the enactment of a minimum hourly wage of $15.00 in the construction sector in the case of public projects, and the utilization of Private Labor Agreements (PLA) in the sector, as decreed in the governor's Executive Order (OE 2018-033) of July 2018.

1.2. Outline of the report

The report is divided into four chapters:

Chapter 2 presents an overview of the economy post-María, in order to provide the economic context, in particular of current trends that impact the construction sector, and at the same time reflect its evolution (Employment, cement sales). It also includes an analysis of costs of materials related to the sector.

In chapter 3, a comparative examination of the PLA's with respect to the construction sector is presented. It includes an overview of the findings of several studies on the subject.

A structural analysis of the employment in the sector is provided in chapter 4, which serves as a basis for the estimates of impacts in chapter 5.

Chapter 5 presents the various estimates and scenarios of potential impacts in the case of employment, occupations, fiscal revenues, prices, on small and medium-size businesses in the sector, and on the general economy. The limitations of the estimates are also included.

The conclusions are presented in the Executive Summary.

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[1] In the US wages for construction workers have increased at a faster rate than wage growth for all private workers in 2018. While wages for private-sector workers have risen between 2.6% and 2.9% y/y, those of production and nonsupervisory construction workers were increasing at 3.8% y/y. See S. Gudell (2018), Construction Worker Wages Are Growing Incredibly Fast, *Forbes* (May 29, 2018), at: https://www.forbes.com/sites/zillow/2018/05/29/construction-worker-wages/.

[2] In the first quarter of 2018, employers in the US were looking to fill an average of 225,000 construction jobs each month. See A. Soergel (2018), Where Are All the Builders?, *The Civic Report* (June 15, 2018), at: https://www.usnews.com/news/the-report/articles/2018-06-15/the-us-construction-industry-is-booming-but-where-are-the-builders.

2. Overview of the Economy Post-María

The analysis covers the period after Hurricane María. The emphasis is on the evolution and trends of key economic indicators afterwards, in order to understand better the structural changes after the hurricane.

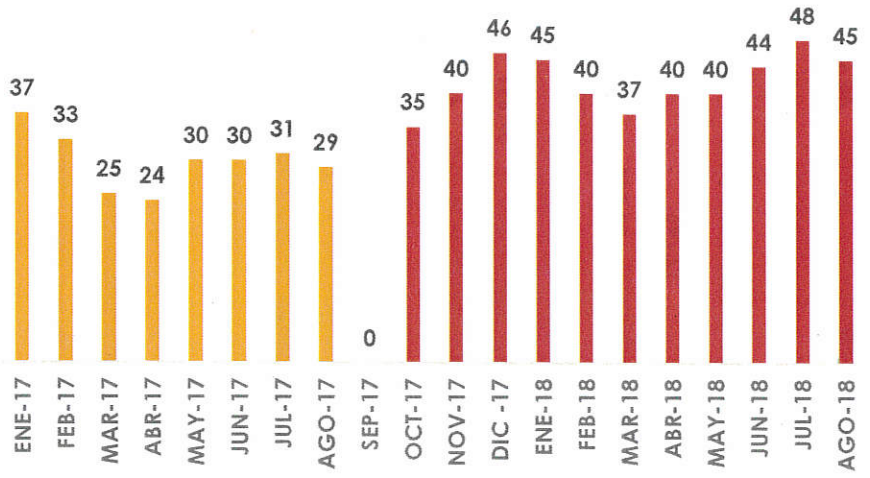
On the economy front, albeit slowly but surely, as key indicators suggest, economic activity is recuperating, pointing to more solid ground in 2019. A good look at coincident indicators, such as total employment, unemployment rate, employment rate, construction employment, cement sales, retail sales, net revenues to the General Fund, the PMI for manufacturing, auto sales have shown since the end of 2017 a positive and upward trend. From real economic growth in fiscal years 2019 through 2023, though, that growth is expected to slow down, with the strong possibility of the economy returning to its historical trend of negative growth afterwards.

2.1. Evolution of key economic indicators

2.1.1. Employment in the construction sector

Employment in the construction sector has been steadily increasing since hurricane Maria. As more public funds are disbursed in the coming months employment should continue to increase.

FIGURE 1 – EMPLOYMENT IN CONSTRUCTION

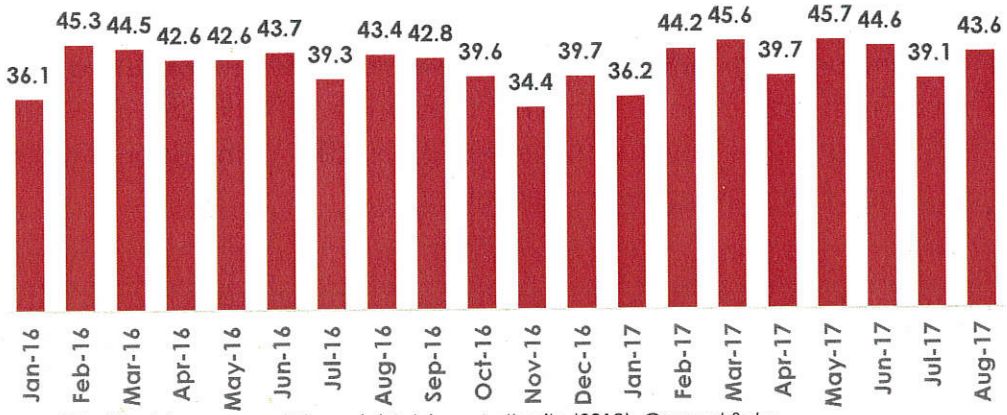


2.1.2. Cement sales

Another important indicator is cement sales, which are a proxy of construction activity. Cement sales were relatively stagnant in 2016 and 2017 prior to hurricane Maria, with sales averaging 41.6 metric tons. This represented sales levels similar to those from

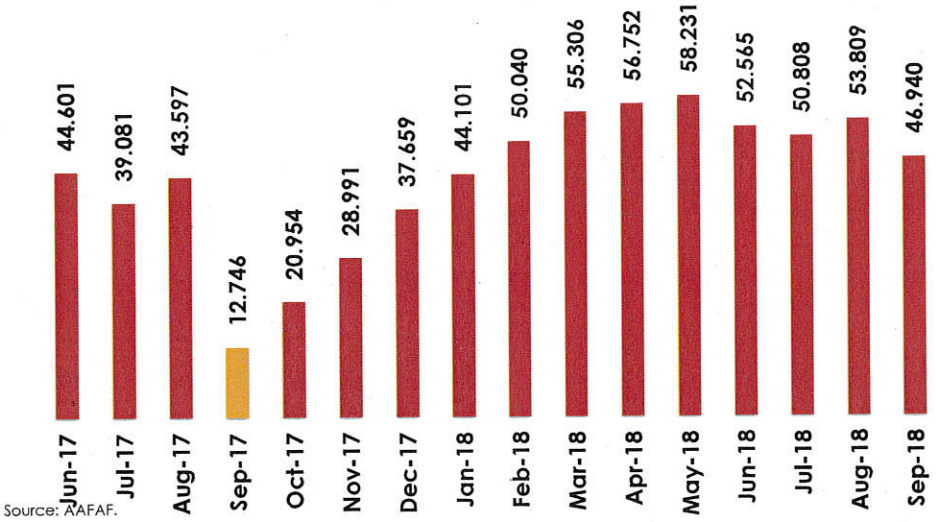
decades ago. Post-Maria this trend has reversed, with an average monthly sale of 46.3 metric tons since October. In the last few months alone, the average has increased to over 50 metric tons. On an accumulated basis (up to September), sales were up by 33.4% y/y.

FIGURE 2 – CEMENT SALES (METRIC TONS) PRE-MARIA



Source: P.R. Fiscal Agency and Financial Advisory Authority (2018). *Cement Sales.*

FIGURE 3 – CEMENT SALES (METRIC TONS) POST-MARIA



Source: AAFAF.

2.2. Increases in costs of construction materials

Contractors' costs for materials have escalated considerably so far this year, compared to pre-hurricane María. Two factors have played a key role: the U.S.-imposed lumber, steel and aluminum tariffs on imports from Canada, Mexico, and the European Union,

and the pressures on the increasing demand for materials and labor as a result of the reconstruction works after 2017 natural disasters.

For instance, the bulk of Puerto Rico's imports of lumber, aluminum and aluminum items come from the Mainland, but an important part of these products are imported by the U.S. Thus, they reflect the impacts of increased tariffs, translating into higher prices for Puerto Rico (See Table 1).

TABLE 1

Imports of Aluminum and Aluminum Items by Country (HTS 76)
2014-2018* (Calendar years)

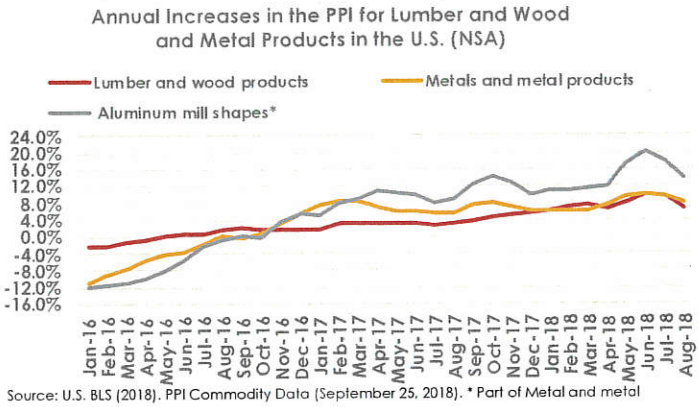
Country	2015	2016	2017	2017*	2018*
U.S.	$103,551,724	$78,318,435	$83,483,245	$24,125,435	$40,329,747
Mexico	$11,656,454	$13,046,696	$14,135,505	$3,944,063	$5,905,237
France	$7,967,478	$7,761,611	$7,695,757	$2,194,276	$3,224,417
China	$6,512,289	$7,583,588	$8,274,031	$2,257,920	$2,492,470
Colombia	$4,791,196	$4,750,521	$3,872,134	$1,183,378	$2,475,671
Greece	$1,178,302	$2,530,118	$3,455,692	$1,127,392	$2,224,232
Dominican Republic	$11,950,758	$10,217,781	$7,084,623	$2,026,687	$1,919,400
Rest of countries	$13,914,860	$12,604,834	$14,999,006	$4,016,942	$6,311,617
Total	**$161,523,061**	**$136,813,584**	**$142,999,993**	**$40,876,093**	**$64,882,791**

Source: Instituto de Estadísticas de Puerto Rico (2018). *Value of imports of goods of Puerto Rico by Harmonized System (HS) - June 2018.*
*January-April.

The prices of products or materials that are important to construction have continued to rise. In the U.S., the producer price index (PPI) for inputs for construction industries, several of which are imported into Puerto Rico, have registered significant increases from 2017. The PPI for lumber and wood products increased on average 7.6% y/y during January-August of this year, from 3.0% in same period in 2017, and from 0.4% in 2016.

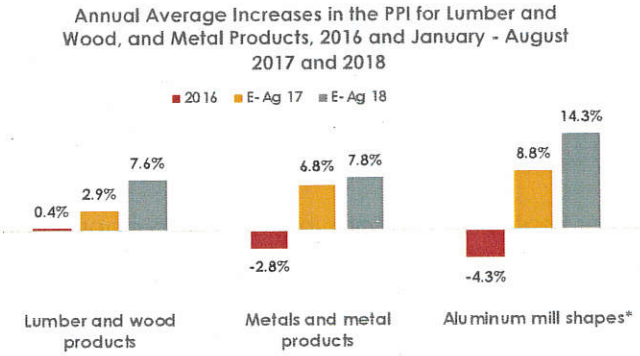
Additional price pressures will come from the new increases on tariffs on U.S. imports from China, where 42.0% of U.S. imports of plywood come from this country. The PPI for metals and metal products also registered steep increases from 2016 and 2017, posting an average growth of 7.8% y/y during the same period. Aluminum mill shapes prices have increased considerably since January 2018, 14.3% y/y, from 8.8% in the same period in 2017.

FIGURE 4



Source: U.S. BLS (2018). PPI Commodity Data (September 25, 2018). * Part of Metal and metal products.

FIGURE 5



Source: U.S. BLS (2018). PPI Commodity Data (September 25, 2018). * Part of Metal and metal products.

Fuel prices in Puerto Rico have also risen. So far this year (January-August), the price of diesel increased an average of 22.0% y/y, from an increase of 14.0% y/y during the same period in 2017.

2.3. Reconstruction funds: Disbursed and approved

The federal government recovery funds come from several sources: those from FEMA, those appropriated to the US Army Corps of Engineers through the Supplemental Funding Act of 2017, Federal Highway, and those to be channeled through the CDBG-DR.

2.3.1. Distribution of funds (FEMA and CDBG-DR)

Because of the scale of destruction caused by hurricane Maria, over $82 billion in Federal recovery funds were assigned to Puerto Rico, as reported in the Certified Fiscal Plan. An additional $8.0 billion is expected in private insurance disbursements.

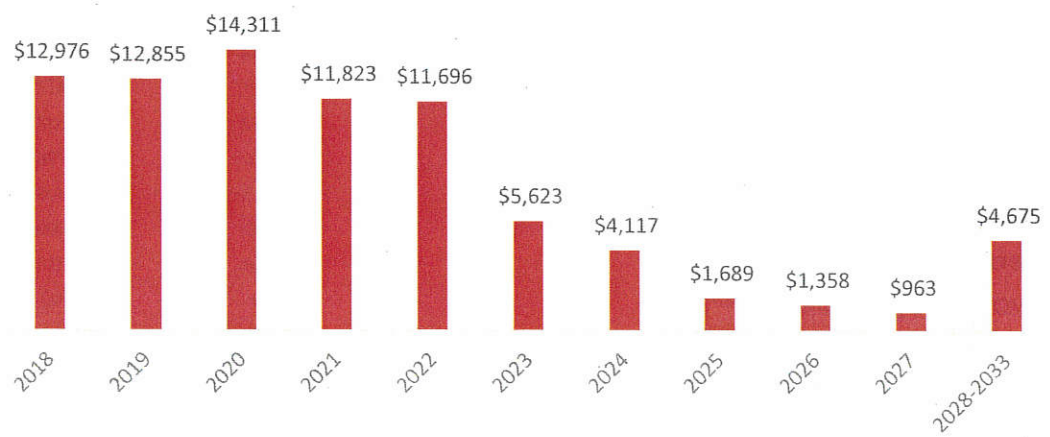
TABLE 2 – CERTIFIED FISCAL PLAN RECOVERY FUNDS

ITEM	$BN
FEMA Public Assistance	**$48.8**
CDBG	**$19.9**
FEMA Individual Assistance	**$3.2**
Private Insurance	**$8.0**
Other Federal Funding	**$5.0**
Total	**$82.0**

These $82 billion are expected to be disbursed over the coming decade as presented in Figure 6. A large portion of the funds are to be spent in the 2018-2021 period when an average $8 billion will spent yearly. This will help generate a tremendous amount of economic activity, particularly in the construction sector which was one of the worst hit after the 2008 financial crisis and never recovered.

To provide some perspective on the amount of money being spent, Puerto Rico's Net General Fund Revenues were $9.3 billion in fiscal 2018; therefore the expected recovery funds are equivalent to nearly doubling the Commonwealth's general fund spending for the duration of the reconstruction program. The impact of these funds has already been felt as will be presented in the following sections, which demonstrate the difference in Puerto Rico's economy before and after Maria.

FIGURE 6 – CERTIFIED FISCAL PLAN RECOVERY SPENDING ($ MILLIONS)



2.4. Principal contractors in infrastructure projects

In addition to Puerto Rico based contractors, the stateside contractors competed for for recovery initiatives related to 2017's natural disasters. As of September 27, 2018, over $4.1 billion dollars were obligated towards Hurricane Maria recovery. Of this amount, Puerto Rican contractors received around 9.3%, or $385 million.

While this may initially suggest that Puerto Rico was outcompeted by states in terms of contracts, the data show that more than half (1,009, or 53.9%) of obligated actions were given to firms incorporated in Puerto Rico.

However, the average value of each obligated action given to Puerto Rican firms was much lower than that of many states, which resulted in a lower total amount of dollars awarded. This is not exclusive to Puerto Rico. For example, California, had only 36 actions obligated, yet received over $1 billion in action value. Delaware, on the other hand, had 204 actions, yet received approximately $800 million.

TABLE 3

Actions Obligated as of September 27, 2018, by Vendor's State of Incorporation

State of Incorporation	Number of Actions	Action Value (Base and All Options)	Average Value of Action
Puerto Rico	1,009	$384,563,459	$381,133
California	36	$1,205,727,980	$33,492,444
Delaware	204	$797,161,809	$3,907,656
New Jersey	38	$555,822,092	$14,626,897
Maryland	54	$190,875,852	$3,534,738
Pennsylvania	28	$170,108,725	$6,075,312
Louisiana	26	$63,267,298	$2,433,358
Minnesota	6	$50,250,000	$8,375,000
Textas	46	$29,365,436	$638,379
Washington, D.C.	7	$21,564,981	$3,080,712
South Carolina	4	$19,443,130	$4,860,783
Virginia	15	$16,318,897	$1,087,926
Missouri	27	$13,638,856	$505,143
Florida	27	$7,975,891	$295,403
Nevada	40	$5,435,641	$135,891
Massachusetts	18	$5,285,259	$293,626
New York	18	$5,213,564	$289,642
Tennessee	12	$4,122,495	$343,541
Kentucky	3	$2,311,430	$770,477
Colorado	5	$1,856,470	$371,294
Georgia	11	$1,318,643	$119,877
New Mexico	7	$1,144,281	$163,469
Ohio	18	$860,933	$47,830
Illinois	9	$689,209	$76,579
Indiana	2	$550,022	$275,011
North Carolina	4	$248,366	$62,092
Wisconsin	2	$220,714	$110,357
Michigan	7	$205,921	$29,417
Utah	2	$110,673	$55,337
New Hampshire	1	$79,996	$79,996
Maine	3	$73,223	$24,408
Virgin Islands	1	$25,000	$25,000
Iowa	1	$17,368	$17,368
Arizona	2	$9,799	$4,900
Mississippi	1	$7,710	$7,710
Not Identified / Foreign	177	$578,423,003	$3,267,927
Total	**1,871**	**$4,134,294,126**	**$89,866,629**

Source: US General Services Administration (September 27, 2018). *Federal Procurement Data System: Hurricane Maria Report* .

3. The Adoption of a Project Labor Agreement (PLA) and Implications

3.1. The Executive Order and Other Jurisdictions

On July 30th, 2018 the Governor of Puerto Rico signed an Executive Order (EO-2018-033), which increased the minimum wage of construction workers, required the use of cement manufactured in Puerto Rico and mandated the use of project labor agreements, for publicly funded projects with an amount over $2MM.

One of the main stated purposes of the Executive Order is to halt the potential outward migration of the Island's current pool of reconstruction workers. Moreover, such migration is partially characterized by high levels of wage inequality and poor labor conditions. Another stated intention is that improved worker's wage conditions will improve the quality of the services performed and reduce migration. More importantly the labor agreements for government projects are required on the basis of workforce stability and professionalization. Even though these are stated goals of the EO, no industry accepted education and certification process is required of potential employees.

As stated in the EO, Project Labor Agreements (or PLAs) will improve coordination between workers, contractors and sub-contractors, particularly by providing a steady workforce. The use of PLAs under the EO will be required to all contractors and subcontractors in any government funded project above $2 million. The agreement must also contain guarantees against strikes or lockouts, contain specific language for labor dispute resolution, and other mechanisms which encourage work productivity and occupational safety[3].

The EO also establishes a sort of exemption to the PLA requirement by establishing that said PLA provisions will not apply when federal requirement prohibits the use of PLAs[4]. However, it's not clear the extension of such provision and how it will reconcile with other potential conflicts.

Per the EO a PLA will be defined as:

> "(f) Agreement covering employees in the building and construction industry
>
> It shall not be an unfair labor practice under subsections (a) and (b) of this section for an employer engaged primarily in the building and construction industry to make an agreement covering employees engaged (or who, upon their employment, will be engaged) in the building and construction

[3] See Section 4, Executive Orden 2018-033

[4] See Section 8, id.

> industry with a labor organization of which building and construction employees are members (not established, maintained, or assisted by any action defined in subsection (a) as an unfair labor practice) because (1) the majority status of such labor organization has not been established under the provisions of section 159 of this title prior to the making of such agreement, or (2) such agreement requires as a condition of employment, membership in such labor organization after the seventh day following the beginning of such employment or the effective date of the agreement, whichever is later, or (3) such agreement requires the employer to notify such labor organization of opportunities for employment with such employer, or gives such labor organization an opportunity to refer qualified applicants for such employment, or (4) such agreement specifies minimum training or experience qualifications for employment or provides for priority in opportunities for employment based upon length of service with such employer, in the industry or in the particular geographical area: Provided, That nothing in this subsection shall set aside the final proviso to subsection (a)(3): Provided further, That any agreement which would be invalid, but for clause (1) of this subsection, shall not be a bar to a petition filed pursuant to section 159(c) or 159(e) of this title." [5]

Using a definition from a leading 1998 GAO study on the subject, a more recent study from Suffolk University (Boston) defined a PLA as "a form of "pre-hire" collective bargaining agreement between building trades unions and the construction clients that typically requires any firm that bids on a project hire workers through union halls and follow union rules on pensions, work conditions and dispute resolution. In return, unions agree not to strike for the duration of the project."[6]

The use of PLAs varies between US jurisdictions, however, the number of states which require the formal use of PLAs is somewhat limited. Since the enactment of the Executive Order of the Federal Government (EO No. 13502), over 24 states have enacted legislation which prohibit government mandated PLAs while 8 others limit PLAs to projects over $25 million[7]. There are 8 states that encourage or require government mandated PLAs and around 18 states which have no particular policy on PLAs (neutral). It is important to note

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[5] 29 U.S.C. 158(f)

[6] Paul Bachman and David G. Tuerck, Project Labor Agreements and Public Construction Costs in New York State, Beacon Hill Institute, April 2006

[7] Extracted from: https://thetruthaboutplas.com/2018/07/02/24-states-ensure-fair-open-competition-restrict-government-mandated-project-labor-agreements/

that the above numbers could also vary if local jurisdictions are considered, that is local governments have enacted norms regarding the use of PLAs.

There are several studies that have been conducted regarding the economic benefits of PLAs. A revision on the literature suggest that there is no conclusive evidence on the positive or negative balance of such agreements. The variability of the main characteristics of a construction project are so wide that any research considering the comparison of multiple construction projects is subject to a high degree of "control" variables to account for project differences. Yet, even controlling for main differences between construction projects, the academic literature is not conclusive in terms of total or overall benefits of PLAs; qualitative issues such as quality of construction, timeliness, outcomes, local conditions, have not been fully measured.

A research from the Congressional Research Service (2010) provides a summary of the main arguments for and against PLAs (extracted verbatim)[8]:

Advantages

- A PLA provides uniform wages, benefits, overtime pay, hours, working conditions, and work rules for work on major construction projects.
- A PLA provides contractors with a reliable and uninterrupted supply of workers at predictable costs for wages and benefits. PLAs prohibit strikes and lockouts. Because local unions are generally members of a national union, a union can recruit workers both locally and nationally.
- A large project is easier to manage if there is a PLA. Instead of dealing with several unions that may have different wages and benefits and whose contracts may have different expiration dates, contractors must deal with a single collective bargaining agreement.
- Because labor costs are predictable and because a PLA makes it easier to manage a large project, a PLA helps ensure that a project will be completed on time and on budget.
- A PLA may help train workers by requiring contactors to participate in apprenticeship and training programs.
- A PLA can improve worker safety by requiring contractors and workers to comply with project safety rules.

[8] Project Labor Agreements, Gerald Mayer. Congressional Research Service (2010)

Disadvantages

- PLAs can increase costs. Because a PLA sets standard labor costs and work rules, nonunion contractors cannot win bids based on lower costs. Nonunion contractors may choose not to bid on projects that are covered by a collective bargaining agreement. The result may be fewer bids and higher costs. These increases in costs have been reported in various studies to be on the order of 12-18%.
- If a PLA requires contractors to hire workers through a union hiring hall, contractors may not be able to use their own workers.
- If a contractor is able to use his own workers, the workers may have to join a union and pay union dues. If a contractor has to pay into a union pension plan, the employees may not be on the project long enough to vest in the plan.
- Nonunion contractors may operate more efficient worker training programs. Instead of apprenticeship programs of a fixed duration, nonunion contractors can train workers for specific tasks.
- Evidence does not indicate that nonunion construction projects are less safe than union projects.
- There have been construction delays attributed to PLA's.

3.2. Conclusions

Based on the information that is currently available, there is no formal conclusion on the positive or negative economic effects of PLAs within the Island. Further research with actual projects performed within Puerto Rico will be required in order to establish an empirical assessment of positive or negative effects[9]. The research performed in the US tends to highlight higher construction costs due to the use of PLAs, however, empirical evidence is not conclusive. Several research papers point out to increases in construction costs of 12%[10] to 18%[11].

Moreover, it's important to consider that the way PLAs have been enacted, it represents a disruption to both, the labor market and a construction industry that historically has not had significant labor disputes. That is, the local EO increases average worker compensation for all government sponsored projects, as well as PLAs for projects above

[9] The effects of a PLA in a jurisdiction is highly correlated to the local dynamics of the labor market, degree of labor organization, and the operational structure of the construction industry.

[10] Paul Bachman, Darlene C. Chisholm, Jonathan Haughton, and David G. Tuerck, Project Labor Agreements and the Cost of School Construction in Massachusetts, Beacon Hill Institute, September 2003.

[11] Paul Bachman and David G. Tuerck, Project Labor Agreements and Public Construction Costs in New York State, Beacon Hill Institute, April 2006

$2 million. Such requirements suppose a substantial increase in transaction costs for companies and workers.

As mentioned above, the effects of PLAs are highly correlated to the dynamics of the labor market and the operational intricacies of the construction industry, thus, enacting such requirements in a time of disaster reconstruction should be cautioned. Since PLAs essentially require the use of union labor and given the low level of unionized workers in the Island, one should expect a disruption in the labor market in the short-term. In an environment in which funds need to be spent within a short timeframe, should a delay occur due to PLA's, it could cause loss of allocated funds to Puerto Rico,

As with any collective bargaining process, and although not specifically required in the EO, a practical consequence is that hiring policies will be centralized via negotiations with labor unions and will require new negotiations for every project in order to comply with the EO. The potential benefits of PLAs seem to be greater in jurisdictions with strong labor disputes (such as strikes and lockouts) within the construction industry. This is not the case in Puerto Rico.

Finally, the potential benefits of PLAs in Puerto Rico will be mostly concentrated on higher construction wages that remain within the economy (that is, if one assumes that PLAs generally increase wages), however, that policy prescription was already enacted via the $15 hourly wage increase.

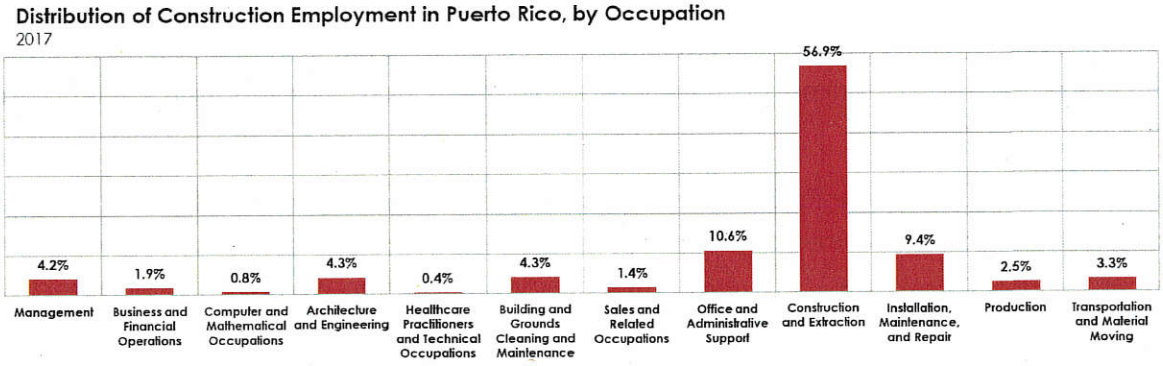
4. Structural Analysis of the Construction Sector

The analysis in the section comprises two components: the composition of employment in the sector and the distribution of wages, and a comparison with other jurisdictions in the US.

4.1. Distribution by occupations and wages

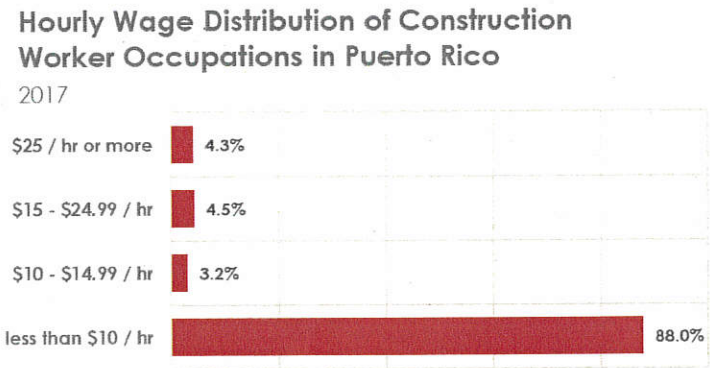
About 56.9% of all jobs in the construction sector are in Construction and Extraction occupations, followed by 10.6% in office and administrative support occupations and 9.4% in installation, maintenance and repair occupations. 88% of all occupations in the sector have an average wage below $10 / hour.

FIGURE 7



Source: US Bureau of Labor Statistics (2018). *Occupational Employment Survey (May 2017): Research Estimates by State & Industry.*

FIGURE 8



Source: US Bureau of Labor Statistics (2018). *Occupational Employment Survey 2017: Research Estimates by State & Industry.*

4.2. Comparison with the states

If Puerto Rico is compared to similar US States (Mississippi, North Carolina, & Florida) instead of the national average the discrepancy in pay isn't as large. With the $15 minimum wage, construction laborers, those that would stand to see the largest increases

in salary, would be making more in Puerto Rico than in Mississippi, Florida, and North Carolina. This, combined with the need to at least double the workforce numbers, would increase construction costs substantially for both the private and public sectors, limiting private investment on the Island. With tariffs already increasing the price of building materials, private construction investment stands to take the largest negative impact.

Although the amount invested in construction might remain the same with or without an increase in the minimum wage, there are likely to be less and/or smaller projects with an increase. For PROMESA covered entities that depend on operational income to fund capital improvement programs, fiscal plans will be negatively impacted due to increased costs.

In the Table below, all estimates are from the same source, the BLS numbers for 2017.

TABLE 4 – MEDIAN HOURLY WAGE IN CONSTRUCTION BY OCCUPATION

Occupation Title	Puerto Rico	Mississippi	Florida	North Carolina
Construction Managers	$25.89	$28.51	$38.46	$45.78
Construction Laborers	$8.69	$13.57	$13.79	$14.00
Construction and Building Inspectors	$10.83	$21.87	$27.38	$25.16
Construction and Extraction Occupations	$9.02	$17.26	$17.48	$17.82

Source: US Bureau of Labor Statistics, Occupational Employment Statistics program. (2017)

Overall, Puerto Rico construction laborers earn between 36% and 38% less than their counterparts in the selected jurisdictions. After increasing the hourly wage to $15 (an 81% increase), a construction laborer in Puerto Rico would be making 7%-10% *more* than in the mentioned states. Although positive for the laborer, this would make labor costs in Puerto Rico higher than in some US states.

5. Impact Scenarios

This section details the estimates for the potential impacts that the Executive Order may have upon the economy and specific sectors.

5.1. Economic Context of the Executive Order

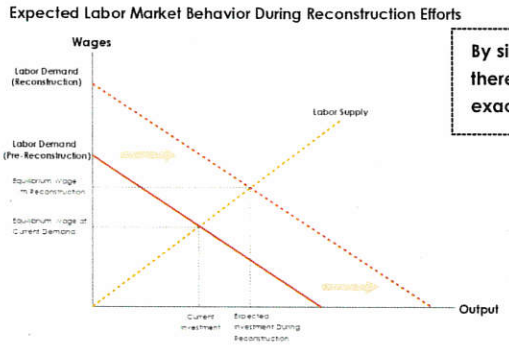
It must be stressed that the economic context in which the legislation develops is one of growth due to federal government expenditures after hurricane María, not of contraction. Public investment is expected to more than double by fiscal 2019 with respect to the levels seen in fiscal 2017, in view of the magnitude of the reconstruction efforts. This heightens demand for construction to levels unseen in more than 10 years.

The increase in construction demand in Puerto Rico also comes at a critical juncture, in which US growth is now hampered by the lack of skilled labor to fulfill critical positions. Job openings reached a record high of 7.1 million In August 2018 – an 18% increase relative to August 2017. Construction job openings outperformed this trend, growing by 38.6% relative to the same period in the previous month.

At the same time, the construction sector in Puerto Rico carries significant drag from its steep deterioration in the last twelve years, reaching a record low in fiscal 2010. The number of employees in construction declined from 87,000 in 2004 to 33,000 in 2017 (Household Survey). The reduction reflects the decreases over time in construction investment. In the present context, it implies a greater scarcity in construction workers relative to previous years, which is likely to increase given the migration patterns in the island.

The scarcity of the labor supply in construction, coupled with the much higher demand due to the reconstruction efforts in Puerto Rico and states such as Florida, introduces significant upward pressures upon prices, both at the consumer and the producer levels. The basic market interaction is shown in the following diagram. As can be seen, the equilibrium wage rises when there is a stagnant supply of labor, but a positive shift in the demand for labor curve.

FIGURE 9



By simple market interaction, wages tend to increase when there is greater demand, but the same labor pool, which is exactly what has happened in Puerto Rico.

Coinciding with these developments, Executive Order 2018-033 as enacted establishes a $15.00/ hour price floor for public construction investment. The timing of this with respect to the boost in investment due to federal funds will force a shift by establishing a price floor to labor supply. Depending upon whether this floor is below or above the equilibrium wage in the sector, it could have a significant impact upon labor surpluses or shortages.

5.1.1. Base Impacts

The Executive Order intends to put the public sector at a relative advantage in terms of acquiring the scarce construction labor in Puerto Rico, by ensuring all its workers earn at least 27% more per hour than those in private construction projects. In addition, workers with wages above $15 / hour would likely receive wage increases as well in order to maintain intra-firm incentive structures, so the public sector could potentially attract skilled workers from other occupations into government work. This displacement would exacerbate the upward wage pressures already felt by the construction sector. It will also have negative impacts on other sectors as substitution of lost workers would not be possible in a very tight labor market,

In addition, there exists a long-term risk in that the new price floor would fix the cost structure of local construction firms above competitive levels after the reconstruction efforts end. The policy would certainly need to be reevaluated in light of the new post-reconstruction economic context.

5.2. Methodology

Our methodology estimates the potential worker displacement that can occur as a result of increased wage costs to firms. It was assumed that:

a) A certain percentage of the payroll in the construction sector would be impacted by the wage differential in the sector. This percentage is expected to range between the publicly-funded construction (expected to be approximately 40% of

gross fixed investment)[12] and the entire construction sector (100% of gross fixed investment).

b) The executive order will apply to the impacted payroll in construction & extraction occupations.
c) Workers above $15 / hour and not in construction would receive a raise of $7.50 / hour on average.

Our methodology consisted of 2 parts: Identifying the affected population and estimating the value of the impact. The affected population ranges between two (2) scenarios: 1) workers employed in public reconstruction projects and 2) all workers in the construction sector. Impacts are measured in the following areas: prices, wages, and employment.

Two scenarios were developed to measure these impacts:

1) Fully Localized – the direct impact is restricted to wage increases in public construction projects only, with no significant impact from private-sector inflation.
2) Fully Generalized – wage increases occur across the entire construction sector, independent of whether investment is public or private.

These scenarios serve as "poles" to estimate a possible impact bound for the Executive Order.

5.2.1. Limitations

Our analysis is focused upon payroll employment, which is the one directly targeted by the Executive Order. There may be additional repercussions to other types of employment (e.g. contract workers) which due to data availability are not covered in this analysis.

5.3. Impact on wages and prices

The primary consequence of the Executive Order is that of an increase in labor costs, i.e. payroll. Using the percentile distribution of wages from Puerto Rico's *Occupational Employment Survey* estimates by state and industry and the assumptions outlined in section 5.1, the impact by occupation was estimated by applying the corresponding wage increases to production workers across each percentile. The final amount was then calculated as a percentage of the total payroll in the sector and converted into contributions to sector growth by multiplying the percentage impact by payroll's share

[12] While in fiscal year 2017, the share of public investment in total investment was 12.8%, the percentage used was much higher given the amount of public investment to be experienced in the coming years. As a result, a value of 40%, well within the upper range of the historical experience in terms of public investment share, was given.

in total construction costs (30%).[13] The result is that the Executive Order contributes 8.0 to 20.5 percentage points (pp) on average to construction costs in the sector. For some construction projects this increase could be as high as 30 pp or more depending on intensity of labor use.

TABLE 5

Price Impact of Executive Order 2018-033

Concept	Minimum Impact (Fully Localized)	Maximum Impact (Fully Generalized Within Sector)
Total Payroll in Sector ($ '000s)	$521,302	$521,302
Impacted Payroll in Sector ($ '000s)	$208,521	$521,302
Total Impact ($ '000s)	$112,238	$280,595
Contribution to Inflation in Sector	8.0 pp	20.5 pp
Contribution to Inflation (Total)	0.5 pp	1.2 pp

Sources: US Bureau of Labor Statistics (2018). *Quarterly Census of Employment and Wages* . US Bureau of Labor Statistics (2018). *Occupational Employment Survey: Research Estimates by State and Industry.* PR Planning Board (2018). *2017 Statistical Appendix* [Table 2] . Estudios Técnicos, Inc. (2018). *ETI Input-Output Model.*

5.3.1. Case Study of a Single Firm

To better illustrate the impact, consider a $10 million base project cost at current prices. Approximately 32% of this cost is due to labor, of which 20% is administrative and the rest is subject to the Executive Order. Applying a wage increase to the lowest-paid laborers would propagate throughout the chain, impacting all occupations at a similar level (quantity-wise, not percentage-wise). This would increase labor costs by about 75%, as illustrated in the following table:

[13] Based upon industry information.

TABLE 6: CASE STUDY FOR CONSTRUCTION COST INCREASE

Base Project Size:		$10,000,000
Concept	**Share (%)**	**Value ($)**
Labor Costs		
Labor (Base Cost)	32.0%	$3,200,000.00
Wage Increase:		
Exempt Labor	7.9%	$252,203
Non-Exempt Labor	67.5%	$2,161,556
Total Wage Increase	**75.4%**	**$2,413,760**
Labor Cost (Post Increase)	**43.0%**	**$5,613,760**
Other Costs		
Concept	**Rate (%)**	**Value ($)**
Municipal Taxes (Post Increase)	5%	$120,688
Sales Volume Tax (Post Increase)	0.50%	$12,069
Insurance Costs (Post Increase)	4.50%	$108,619
OH & Profit (Post Increase)	15%	$398,270
Materials, Equipment & Others		$6,800,000
Total Cost		**$13,053,406**
% Increase		**30.5%**

The resulting cost increase would reach 30.5%, well over the industry average estimated above.

5.3.2. Impacts on the Overall Cost of Goods

To estimate the overall contribution of this impact to the sector, the Leontief Input-Output price model was used to model price impacts of the final demand relative to the new prices. It was found that the average price of goods increases between 0.5 pp and 1.2 pp due to the increased costs on the construction sector.

5.4. Impact on employment

The increased competition from public construction projects as well as external pressures will impact a large number of workers in construction. These affected workers could either a) find other jobs within the local construction sector, b) move to another sector in the economy, or c) move to another jurisdiction. According to estimates, the number of displaced workers is expected to range from 5,042 in a fully localized impact scenario to 12,604 in a fully generalized impact within the sector. In the latter scenario, workers are expected to be displaced out of the local construction sector in the island.

TABLE 7

Displaced Employees, by Employment Size Class of Establishments

Employment Size Class	Minimum Impact (Fully Localized)	Maximum Impact (Fully Generalized Within Sector)
1 - 4 Employees	374	935
5 - 9 Employees	431	1,079
10 - 19 Employees	681	1,703
20 - 49 Employees	1,171	2,927
50 - 99 Employees	959	2,398
100 - 249 Employees	882	2,205
250 - 499 Employees	370	926
500 - 999 Employees	172	430
Total	**5,042**	**12,604**

Sources: US Census Bureau (2018). *2016 County Business Patterns* . Estimates by Estudios Técnicos, Inc. (2018).

5.5. Impact by occupations

Of the estimated one-year increase in total wages, less than 50% is attributable to increases in the actual population by the Executive Order. Approximately 52.8% of the impact is upon populations either with wages above $15 / hour or not related to construction and extraction occupations (i.e. maintenance, transportation, etc.). "Other" includes mainly non-production occupations, such as managers, supervisors, and other technical occupations, and represents 32.8% of the increase. Installation & maintenance occupations represent 12.4% of the estimated increase in total wages, followed by transportation and material moving occupations with 4.4%. The remaining occupations amount to 3.3% of the total wage increase.

TABLE 8

Distribution of Wage Increase by Occupation Group
2017

Occupation Group	Value of Wage Increase in Sector	
	Scenario 1 (Fully Localized)	Scenario 2 (Fully Generalized)
Construction and Extraction Occupations	$53,905,274	$134,763,185
Other Occupations	$37,502,400	$93,756,000
Installation, Maintenance, and Repair Occupations	$14,144,000	$35,360,000
Production Occupations	$3,813,333	$9,533,333
Transportation and Material Moving Occupations	$4,992,000	$12,480,000
Unweighted Total (OES Basis)	**$114,357,008**	**$285,892,519**

Sources: US Bureau of Labor Statistics (2018). *Occupational Employment Survey: Research Estimates by State & Industry.* Estimates by Estudios Técnicos, Inc. (2018).

5.6. Impact on small and medium-size businesses

It is expected that a disproportionate share of the impact will fall upon small and medium businesses in Puerto Rico. According to the *County Business Patterns*, small and medium establishments represent 95% of the number of establishments, and 53% of employment. This means that (on average) more than half of the displaced workers currently form part of a small or medium establishment in Puerto Rico.

TABLE 9

Employment and Number of Establishments in Construction in PR , by Employment Size Class

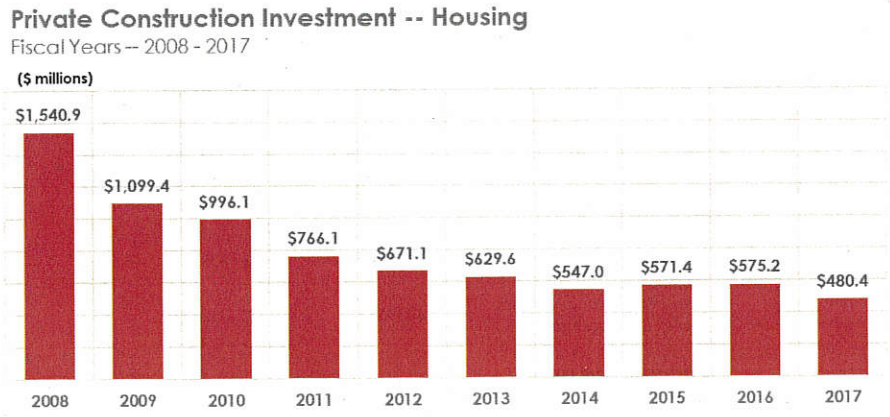
Concept	Small and Medium Establishments (0 - 49 employees)	Large Establishments (50 employees or more)	Total	% in Construction Sector
Number of Establishments	1,616	91	1,707	94.7%
Employment	11,557	10,367	21,924	52.7%

Source: US Census Bureau (2018). *2016 County Business Patterns* .

5.7. Impact on residential construction

Due to the significant amount of federal funding allotted to residential reconstruction, it is expected that construction investment will increase significantly in this segment, particularly in light of its collapse experienced since 2006. The impact of the higher wage requirements for this new investment, however, would result in house prices being driven higher. Considering that 66.8% of new housing demand is at the $105,000-$199,999 price range, it is possible that new home purchasers may have to settle for substandard units relative to their payment capacity due to the new price points. Many other homeowners would be unable to acquire housing units as the affordability gap widens.

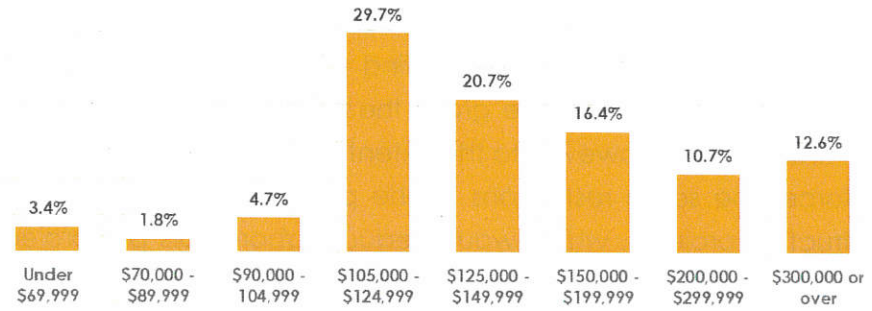
FIGURE 10



Source: PR Planning Board (2018). *2017 Statistical Appendix* [Table 8].

FIGURE 11

Distribution of New Housing Unit Sales, by Price Range
2017



Source: Estudios Técnicos, Inc. (2018). *Construction and Sales Activity Report.*

5.8. Impact on tax revenues

The primary tax impact for state tax revenues is the *shifting* of revenues from one base to another. Firms will (on average) see their margins reduced, which would decrease corporate tax revenues. On the other hand, the State will also see a greater share of individual income taxes plus sales taxes. There will, however, be a decline from displaced individuals who choose to leave the island.

Government expenses will also increase, as regular maintenance and repair of public buildings becomes costlier. This could limit the number of repairs that could be done per year, meaning the rebuilding process will take longer.

5.9. Impact on the general economy

The direct impact of the Executive Order is twofold: a reduction in the number of projects doable under the current funding, and an increased incentive to reduce labor in public construction projects. The private sector now must compete with government projects and other mainland jurisdictions in attracting and maintaining skilled labor. The net result will be an increased cost for residential, manufacturing, hotel and other construction projects. Thus, for example, projected construction investment of $1.0 billion in new manufacturing facilities will now have a cost that could be as high as $1.2 billion, a major dissuasive factor for new investment, which the economy badly needs.

To the extent that federally funded large scale projects are mostly constructed by mainland firms, the impact of the increase in wages will impact will be felt by local construction firms and the private sectors, not only in construction, but also in the rest of the economy, as exemplified by the above example. The construction sector may experience consolidation, as many local firms will not be able to cope with the new wage cost structure.

5.9.1. *Effects of the displaced economy*

The displaced workers will be part of a significant change in the sector composition. As stated before, the higher-paying construction jobs will become scarcer due to a) less volume of projects being performed and b) incentives to reduce labor-hours in projects. These construction workers may, however, find work in private construction projects, which are also expected to increase given the private sector's demand for restoring damages to infrastructure. However, to the extent that inflationary pressures apply to the scarce workforce, the same restrictions to the public sector will more or less impact private construction projects, which would reduce labor-hours per project. This implies that there will be a segment of displaced construction workers who must a) find jobs in another sector or b) leave the island.

The sudden surge in public funds, combined with the increase in wages, might drown out local private investment due to increasing costs, leaving a smaller and weaker private sector when the federal funds eventually run out. Since the beginning of Puerto Rico's fiscal crisis, private investment in construction has been the main driver of the local construction sector. Cost increases would exacerbate the expected post-recovery decline by weakening the private sector.

Note that wages and prices are medium-term macroeconomic phenomena; even if the Order was repealed by the end of the funding period, it could take a sizable amount of time before the wage structure changes. On the other hand, the fast pace at which inflation is expected to grow could absorb real wages and impact the macroeconomic outlook going forward. This will have serious implications upon Puerto Rico's capacity to meet Fiscal Plan targets and will most likely require major adjustments since costs of infrastructure and other projects, housing for example, will increase substantially, in some cases by as much as 25/30%.

5.10. Additional economic impact of the PLA

In addition to the impacts estimated above, the PLA analysis concludes that there are potential increases in labor costs due to the implementation of such agreements in the industry, ranging between 12% and 18% according to some research estimates. This would imply an additional impact of up to 1 percentage point above the estimated increase in the overall price of goods. If this were combined with the impact of the increase in the minimum wage, inflation could increase by up to 2.2 pp, a substantial increase. This increase in inflation could reduce real output in the economy, thus lowering economic growth prospects.

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