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Economic Issues
Periodic research and data reports on issues of current interest
State of Hawaii - Department of Business, Economic Development & Tourism
Research & Economic Analysis Division

Construction and Hawaii's Economy

an analysis of the past and forecast of the future

February 20, 2014

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1. INTRODUCTION

The construction industry is the fourth largest private industry in Hawaii as measured by the share of the State's gross domestic product (GDP), following tourism, real estate, and health care. In 2013, the construction industry completed an estimated $7.7 billion of projects, generated $4 billion in GDP, and contributed 32,000 payroll jobs to the economy.

Construction demand is influenced by the growth of population and the growth of other industries including hotel, retail, education, healthcare, and Federal military. Construction is also influenced by the monetary policy of the Federal Reserve Bank, which adjusts interest rates thus affecting the cost of construction loans.

The construction industry differs from other industries in that, not only does it add economic value to the current year, but it also contributes to the capital stock to be used in future years. This is significant because capital stock is one of the main factors determining long term economic growth.

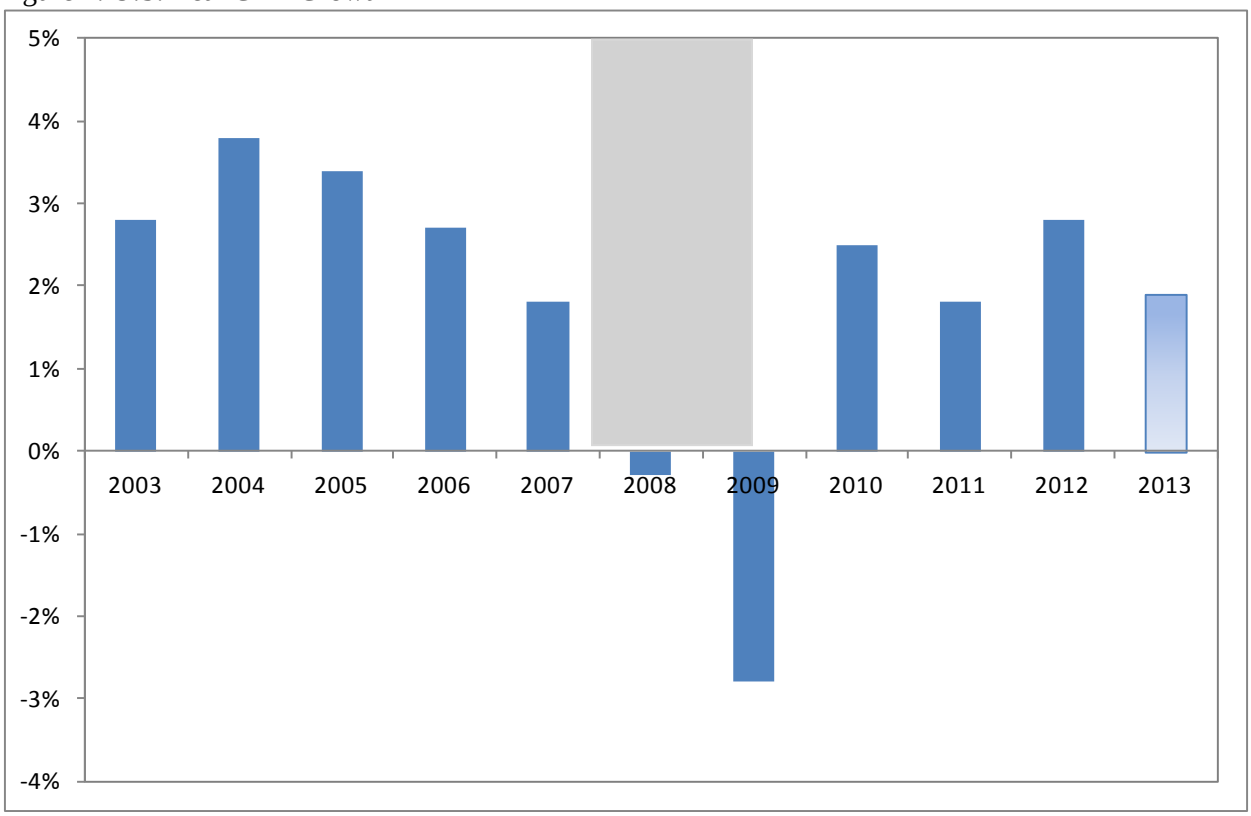
Governments often use construction as the main fiscal policy tool to adjust economic growth, especially at the state and county levels. When the economy is in recession, governments tend to spend more on public construction by raising funds from selling government bonds. When the economy is in the expansion phase, governments tend to restrict public spending on capital projects and divert the money to other uses such as reserves and a rainy day fund. This practice helps to stabilize the construction industry and thus help the overall economic growth.

This report examines the trends of Hawaii's construction industry during the previous and the current business cycles, identifies the demand drivers for Hawaii's construction industry especially for housing, analyzes the economic contribution of the construction industry, and forecasts the growth of the industry for 2014 and 2015.

The Great Recession has been the largest economic calamity of our generation. This recession started in December 2007 and lasted until June of 2009. During this time the country experienced a plunge in real estate values, deep declines in the stock market, a credit crisis, and an unemployment rate that was unprecedented in recent history.

From June 2009, the U.S. economy entered the expansion phase of the business cycle. Real GDP growth was 2.5 percent in 2010, 1.8 percent in 2011, and 2.8 percent in 2012 (Figure 1). The estimate for 2013 real GDP annual growth was 1.9 percent (BEA 2014). The major drag on 2013 growth was a decrease in federal spending. While 2013 growth was below 2012, the end of 2013 saw an acceleration of growth in the second half of the year, with 3rd and 4th quarter growth rates increasing at 4.1 percent and 3.2 percent respectively over the previous quarters (BEA 2014)

Figure 1. U.S. Real GDP Growth

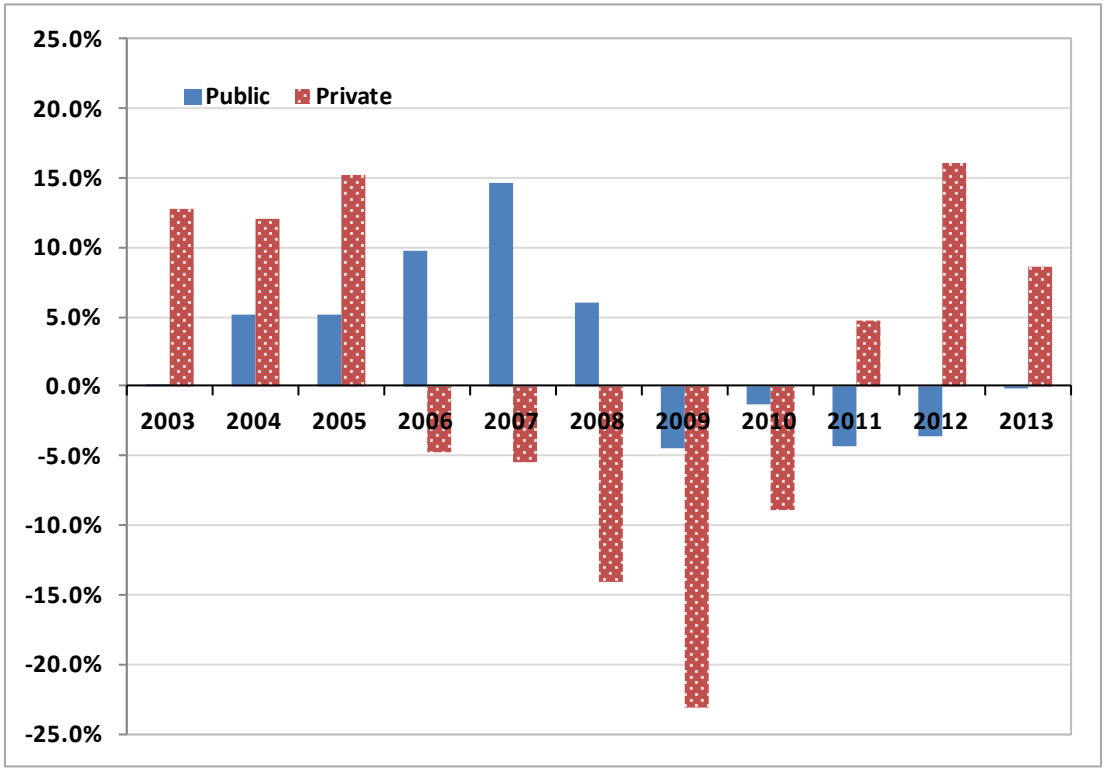


Source: U.S. Bureau of Economic Analysis
2013 figure is the Bureau of Economic Analysis advance estimate 1/30/2014
/shaded area is Great Recession from 12/2007 to 6/2009 as defined by NBER

2.1 Overview of the Construction Industry

The recession hit the construction industry especially hard. Overall, construction spending in the U.S. declined drastically from a peak of $1.2 trillion in 2008 to a trough of $750 billion in 2011. While construction spending was one of the hardest hit sectors, it was also a tool used by the federal government to stimulate the economy during the recession. The percentage of construction spending by the public sector as a percentage of total construction spending rose from a pre-recession average of 23 percent (2003 to 2007) to an average of 34 percent after the start of the recession (2008-2012). However, as the economy recovered, the federal government throttled back on construction stimulus measures. From 2011 through 2013, the private sector has been increasing construction spending while the public sector has been reducing spending (Figure 2). One of the reasons for the rapid growth in the private sector is pent up demand. As individuals and companies conserved cash during the recession, many construction projects were put on hold. The recent increase in private sector spending is an indicator that the private sector is starting to utilize their resources for new construction and capital improvement projects.

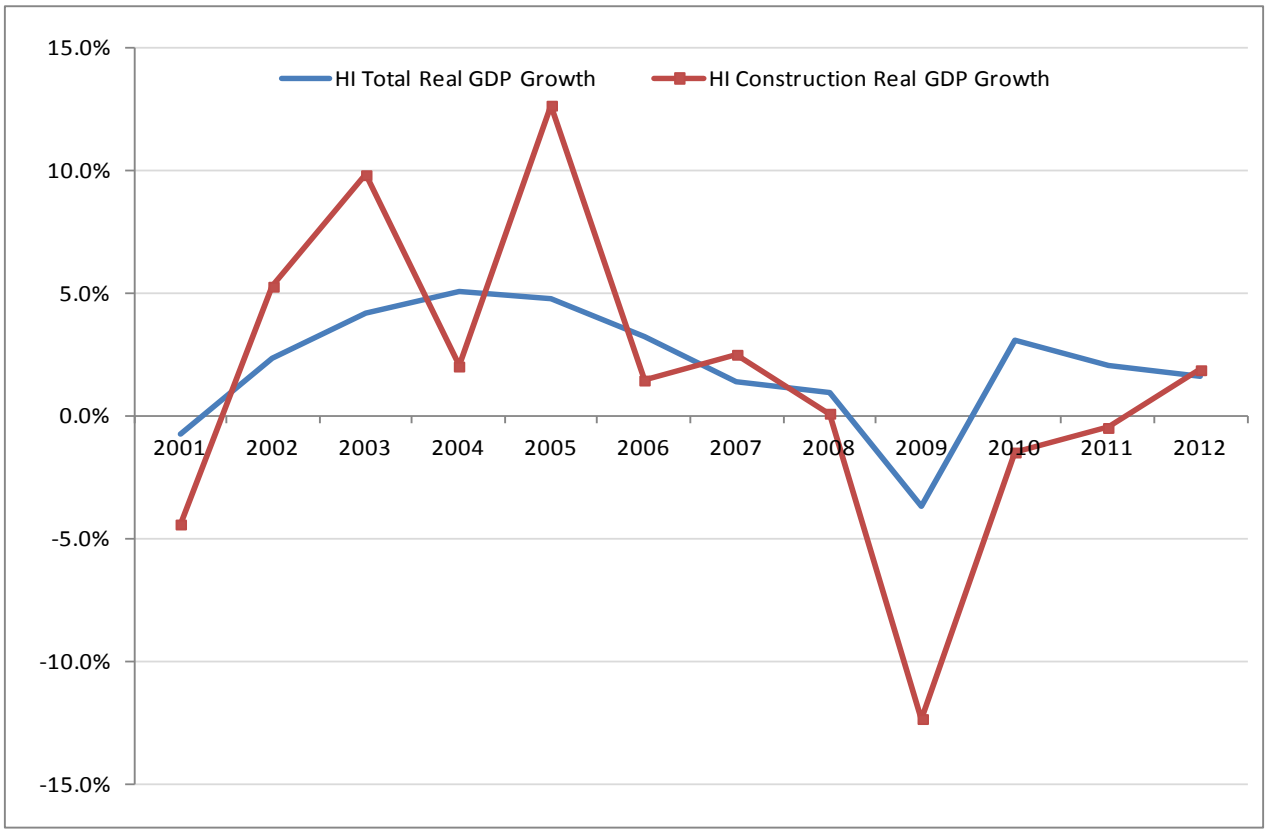
Figure 2. U.S. Construction Spending Annual Growth: Public and Private



Source: U.S. Census Bureau 2013
2013 is annualized estimate based on year to date growth

During the last decade, the state's construction industry experienced a period of expansion, severe contraction, and renewed expansion. The construction industry started the new millennium strong with seven consecutive years of annual real GDP growth from 2002 through 2007 and an annual compound growth rate at 5.6 percent during these seven years. The growth rate peaked in 2005 at 12.7 percent and then began a dramatic slide with 2006 at 1.5 percent and 2007 at 2.5 percent. In 2008, growth came to a virtual halt as the impacts of the recession began to take hold of the construction industry. In 2008, Hawaii's construction industry growth rate dropped to near zero and then declined to a negative 12.3 percent in 2009. As the state's economy emerged from the recession, Hawaii's construction industry recovery lagged that of the state's overall economy. In 2010, the state's overall economy grew at a rate of 3.1 percent, while the construction industry declined 1.5 percent. In 2011, the state's economy grew at 2.1 percent, while the construction industry declined 0.5 percent. However, this trend reversed in 2012 as Hawaii's construction industry surpassed the total state GDP growth rate, with state total real GDP growth at 1.6 percent and the construction sector at 1.9 percent (Figure 3). This trend appears to be continuing in 2014, as Hawaii's construction industry continues to grow.

Figure 3. Comparison of Hawaii's Construction Industry With Total GDP Growth



Source: U.S. Bureau of Economic Analysis

In spite of the volatility of Hawaii's construction industry over the past decade, a number of major developments were completed that changed the landscape of the state. The most prominent of these was Disney's Aulani Resort and Spa, which added the Magic Kingdom to Hawaii's portfolio of destination resorts. This $800 million development spans 21 acres and includes 359 hotel rooms and 460 time-share units. The table below summarizes other major development projects from 2001-2012 including the John A. Burns School of Medicine in Kakaako, the Trump Tower in Waikiki, and the University of Hawaii West Oahu development (Table 1).

Table 1. Major Construction Projects 2001-2012

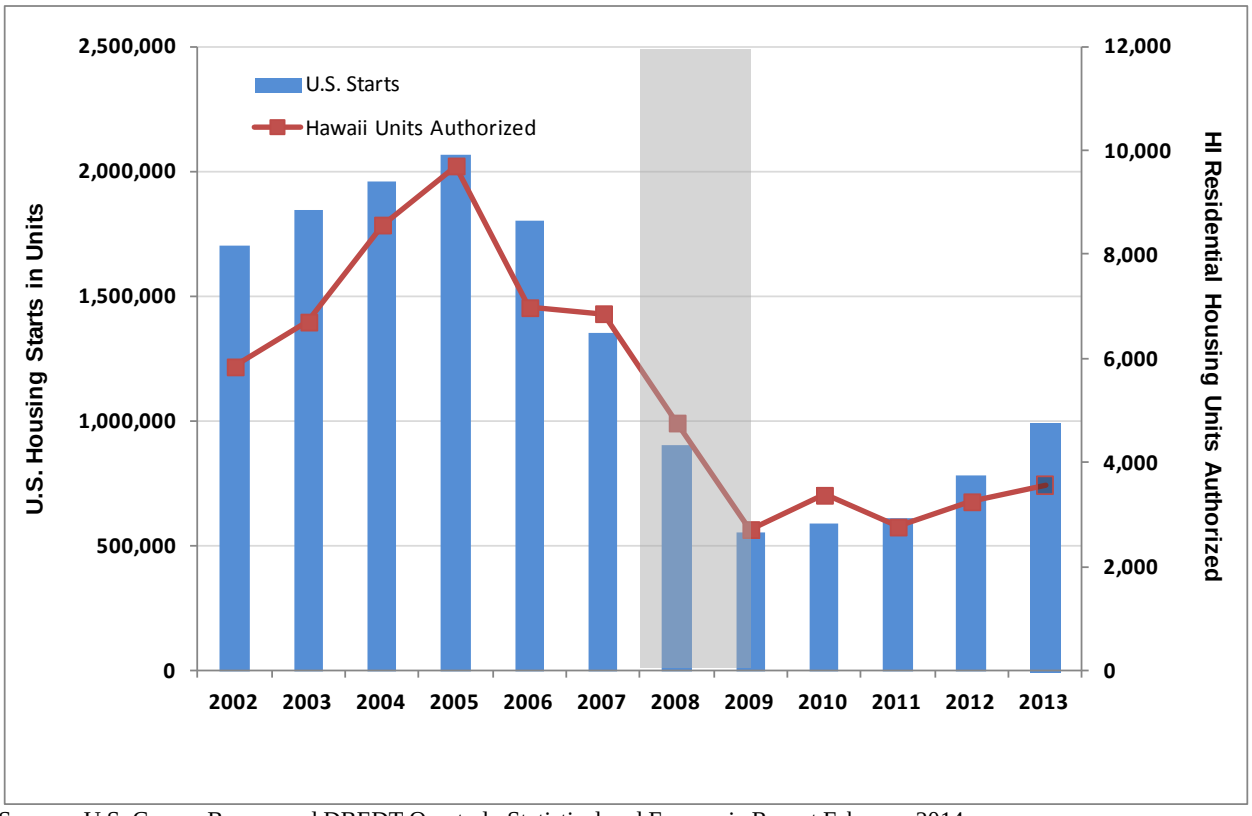
Year	Project	Description
2001	Kamehameha School Campus	Kamehameha school opens 300-acre campus at a permanent site in Kea'au, Big Island.
2003	Navy Housing Replacement	Hale Moku Navy Family Housing Replacement project is completed.
2003	Marriott's Waiohai Beach	The first phase of timeshare property at Marriott's Waiohai Beach Club opens.
2005	Medical School	University of Hawaii opened the John A. Burns School of Medicine's new Kaka'ako campus.
2006	Kaka'ako Residential Development	Two luxury residential towers open in Kaka'ako. Hokua with 247-unit and 40-story and Ko'olani with 369-unit and 47-story.
2007	Waikiki Beach Walk	Waikiki Beach Walk opens after renovations, with $535 million retail, entertainment and hotel development.
2008	Grand Waikikian	Hilton Grand Vacations opens the Grand Waikikian at the Hilton Hawaiian Village Beach Resort & Spa. The new building, 38-story and 331-unit, is the company's fifth time-share development in Hawaii.
2009	Trump Tower	Trump Tower opens as a part of Waikiki Beach Walk redevelopment.
2009	Kapolei Commons	Kapolei Commons opens in Kapolei. A $250 million shopping center development that is anchored by major retailers including Target, Sports Authority, Office Max, and Petco.
2010	Kualakai Parkway	Kualakai Parkway, the new North-South Road between Kapolei and Ewa, is completed after more than four years of construction at a total cost of $155 million.
2011	Aulani Disney Resort and Spa	The first phase of Aulani, Disney Resort and Spa, Ko Olina construction is completed. Aulani offers 359 hotel rooms and 481 time-share units.
2012	UH West Oahu's Campus	UH West Oahu's new campus is completed on 41-acre property in Kapolei and opens for the 2012-2013 school year.
2004-2012	Walmart Expansion	Walmart expands in the state with Keeamoku (2004), Pearl City (2006), Kapolei (2012). Also, plans to open in downtown Honolulu.

In summary, Hawaii's construction industry started an expansion cycle in 2002. By 2007, the value of construction completed, as measured by the contracting tax base, reached a historical peak of $8.1 billion and then began to decline. After hitting a low point in 2010 of $5.6 billion, Hawaii's contracting tax base has been steadily increasing and the estimated 2013 value is $7.7 billion.

2.2 Residential Construction Units

The figure below compares U.S. residential housing starts with Hawaii's residential units authorized. The severity of the recession can be seen in the U.S. residential housing start numbers. Almost three quarters of the U.S. residential construction activity disappeared between 2005 and 2009, with 2.1 million starts and 554,000 units respectively. The December 2013 seasonally adjusted annual U.S. housing start estimate was 986,000 units and, while this is an improvement, it is still less than half the 2005 peak (Figure 4). Hawaii's residential construction industry has generally followed the national residential construction trend. Hawaii's residential construction, as measured by residential housing units authorized, peaked in 2005 with 9,706 units. The market then declined sharply to a trough of 2,722 residential construction units in 2009. The recovery in this industry has been gradual with authorized units still substantially below the 2005 peak. However, 2013 showed a strong increase of 9.4 percent, with 3,561 housing units authorized.

Figure 4. U.S. and Hawaii New Housing Units



Source: U.S. Census Bureau and DBEDT Quarterly Statistical and Economic Report February 2014
/shaded area is Great Recession from 12/2007 to 6/2009

2.3 Value of State Private Building Permits

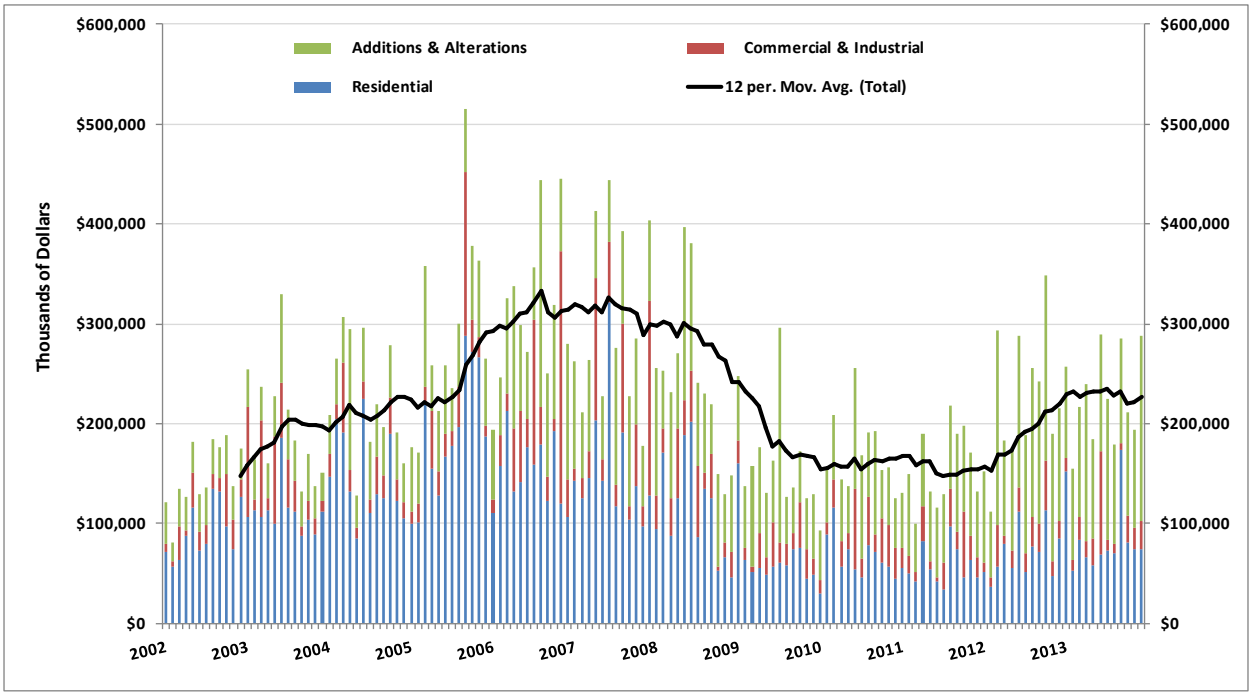
The total value of private building permits in the state was up 3.0 percent in 2013 over 2012. The Residential category led the growth with an increase of 22.4 percent and the Commercial and Industrial category followed with an increase of 9.4 percent. However, the Additions and Alterations category was a drag on growth and declined by 8.9 percent over 2012. As will be discussed below, photovoltaic panel installations are included in the Additions and Alterations category and the decline can partially be attributed to Hawaii's solar tax credit revisions and electrical grid constraints. The largest share of private construction in the state in 2013 was the Additions and Alterations category, which comprised 51.3 percent. This was followed by Residential at 37.8 percent and Commercial and Industrial at 10.9 percent (Table 2).

Table 2. State Private Building Permit Values in 2013: Percentage Share and Growth

Category	% of Total	% Growth from 2012
Residential	37.8%	22.8%
Commercial & Industrial	10.9%	9.4%
Additions & Alterations	51.3%	-8.9%
Total	100%	3.0%

In looking at the 12 month moving average, Hawaii's private building permit values increased in 2012 and then leveled off in 2013 (Figure 5).

Figure 5. State of Hawaii Monthly Value of Private Building Permits



Source: DBEDT Monthly Economic Indicators

2.4 Value of County Private Building Permits

In 2013, the total value of private building permits for the state was $2.7 billion. Honolulu County made up the majority of these permits with $1.9 billion or 69 percent of the state total. Honolulu was followed by Hawaii County with $443.7 million or 16 percent, Maui County with $325.0 million or 12.0 percent, and Kauai County with $85.4 million or 3 percent (Kauai County private permits only include residential construction). The following section will examine the construction industry for each county.

Honolulu County Private Building Permits

Honolulu County distinguishes itself as the only county where the industry has recovered to pre-recession levels. The monthly average permit value from 2003 through 2007 was $118.3 million and from 2008 through 2013 the average has reached $124.9 million.

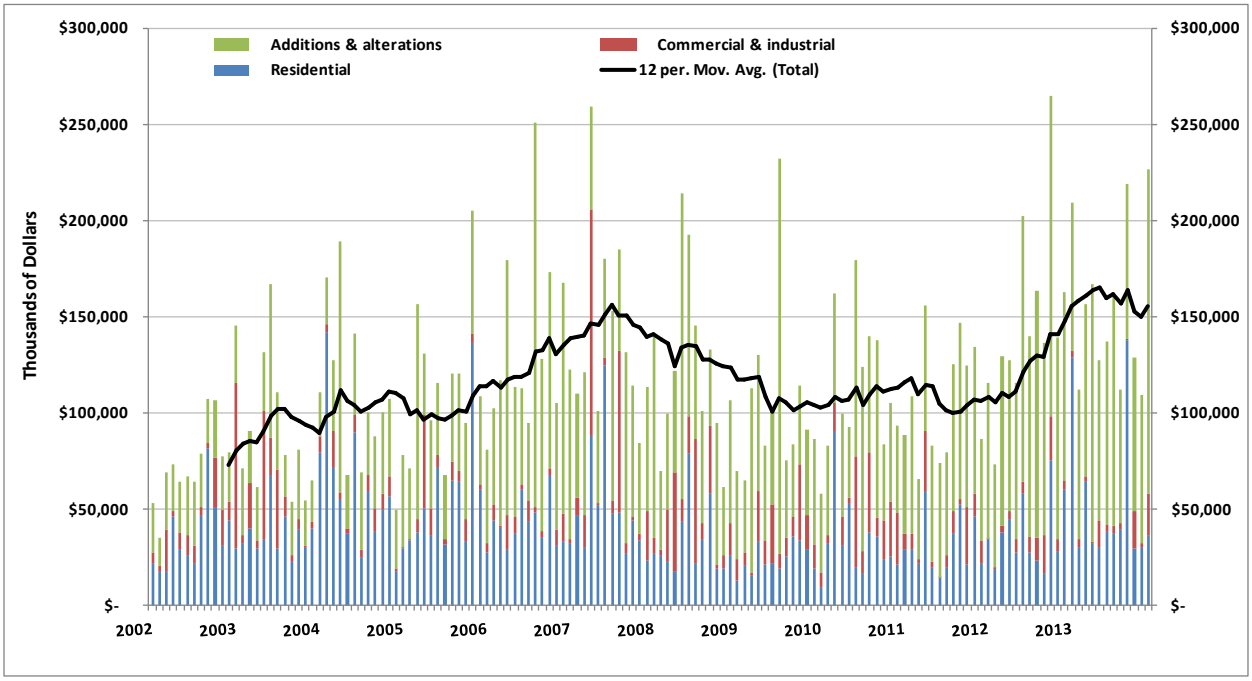
The 2013 value of Honolulu private building permits increased 5.5 percent over 2012. The Residential category was up sharply, with a 40.5 percent growth over the same period of 2012. However, the Commercial and Industrial and Additions and Alterations categories slowed down with declines of 15.8 percent and 5.7 percent respectively over 2012. The Additions and Alterations category was the main driver for Honolulu construction in 2013, with a share of 61.7 percent of the total. This was followed by the Residential at 33.9 percent and Commercial and Industrial at 4.4 percent (Table 3).

Table 3. Honolulu County Private Building Permit Values in 2013: Percentage Share and Growth

Category	% of Total	% Growth from 2012
Residential	33.9%	40.5%
Commercial & Industrial	4.4%	-15.8%
Additions & Alterations	61.7%	-5.7%
Total	100%	5.5%

In looking at the 12 month moving averages in Figure 6, Honolulu County permits started a gradual decline in mid-2007. However, the downturn for Honolulu was much shallower than that of the other three counties. Permits started to trend up in mid-2011 and then leveled off in 2013 (Figure 6).

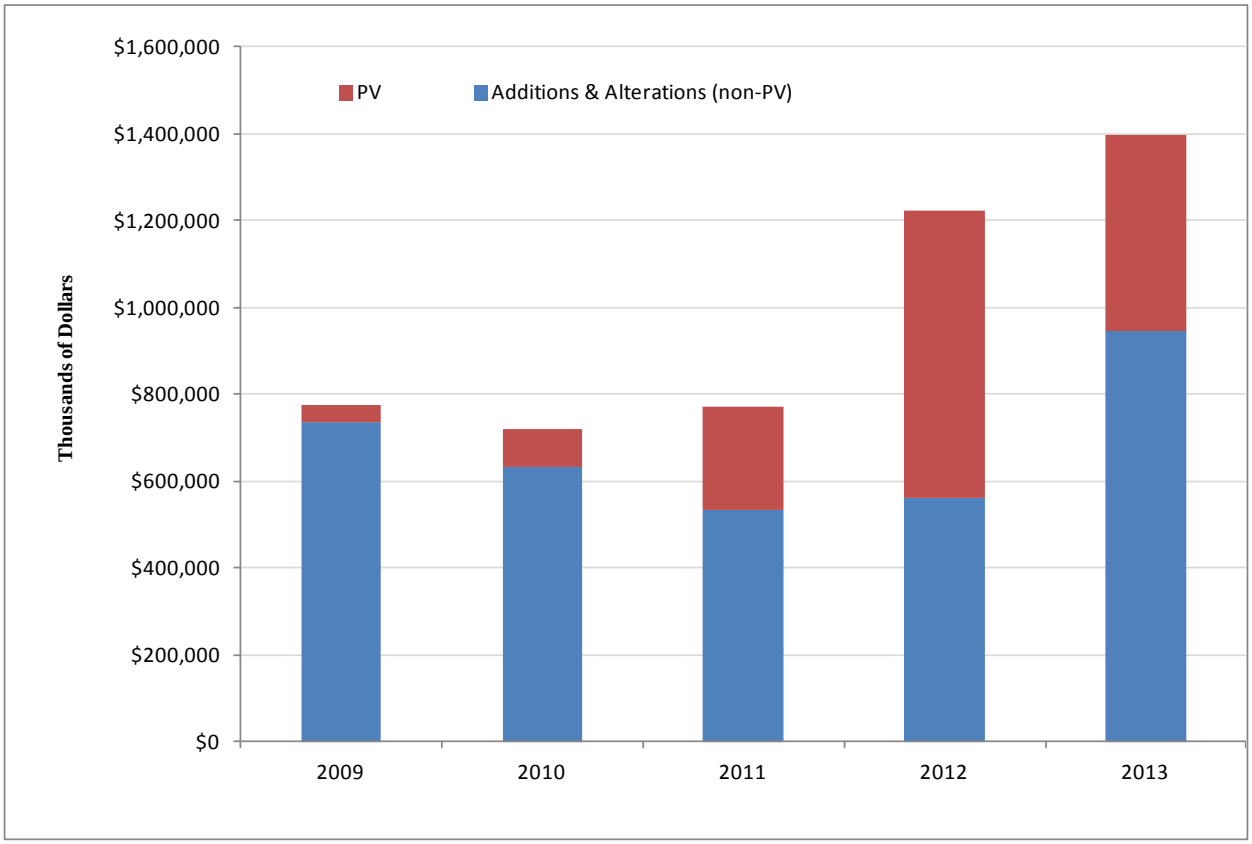
Figure 6. Honolulu County Monthly Value of Private Building Permits



Source: DBEDT Monthly Economic Indicators 2013

Photovoltaic installations drove much of the recent growth in Honolulu's Additions and Alterations category through 2012. The value of photovoltaic permits increased from $40 million in 2009 to $659 million in 2012. Photovoltaic as a percentage of the Additions and Alterations category also rose from 5 percent in 2009 to 54 percent in 2012. However in 2013, the value of Honolulu photovoltaic permits has declined substantially. The 2013 value of Honolulu photovoltaic permits was down 29.7 percent from the previous year. The Additions and Alterations permit value was $1.4 billion, with photovoltaic permits comprising 32 percent or $454.5 million of the Additions and Alterations category (Figure 7).

Figure 7. Honolulu Additions and Alterations Permit Values with Photovoltaic



Source: DBEDT Monthly Economic Indicators and Honolulu Weekly PV Permit Report 2013

Hawaii County Private Building Permits

Hawaii County's recovery has been more gradual than Honolulu County's recovery and the value of building permits is still substantially below the pre-recession level. The monthly average permit value from 2003 through 2007 was $71.7 million and from 2008 through 2013 this average declined to $35.1 million. Residential construction is the largest category for Hawaii County at 43.9 percent of the total private permits. Residential is followed by Additions and Alterations at 38.6 percent and Commercial and Industrial at 17.5 percent.

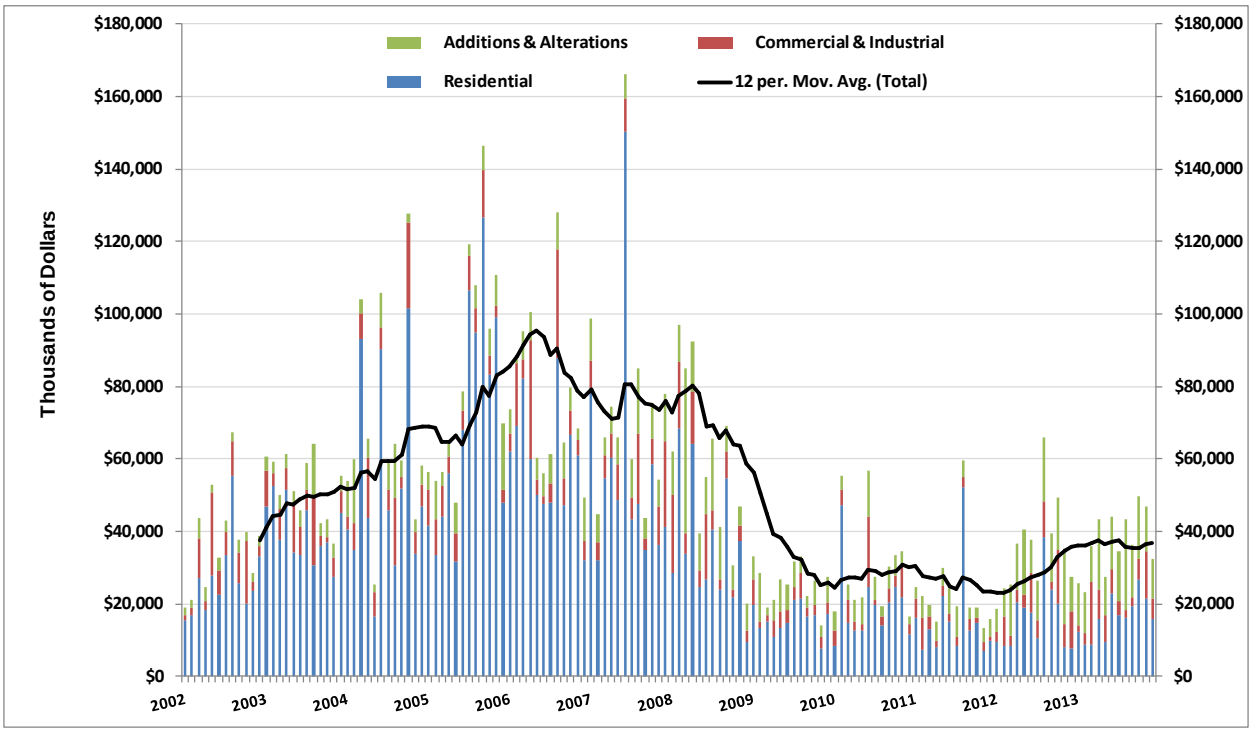
The 2013 value of Hawaii County private permits is up 3.8 percent over 2012. Leading the growth is the Additions and Alterations category, with a 10.4 percent increase over the previous year. The residential category was up slightly, with a 1.3 percent increase and the Commercial and Industrial category was down slightly, with a 2.9 percent decrease (Table 4).

Table 4. Hawaii County Private Building Permit Values in 2013: Percentage Share and Growth

Category	% of Total	% Growth from 2012
Residential	43.9%	1.3%
Commercial & Industrial	17.5%	-2.9%
Additions & Alterations	38.6%	10.4%
Total	100%	3.8%

In looking at the 12 month moving averages in Figure 8, Hawaii County permits started a steep decline in mid-2008 and values are still well below the peak level. The trend shows a gradual increase in the value of private permits starting in mid-2012 and then a leveling off in 2013 (Figure 8).

Figure 8. Hawaii County Monthly Value of Private Building Permits



Source: DBEDT Monthly Economic Indicators Various 2013

Maui County Private Building Permits

The recovery of Maui's construction industry has been gradual and monthly permit values are still substantially below pre-recession levels. The monthly average permit value from 2003 through 2007 was $57.6 million and from 2008 through 2013 this average declined to $25.0 million.

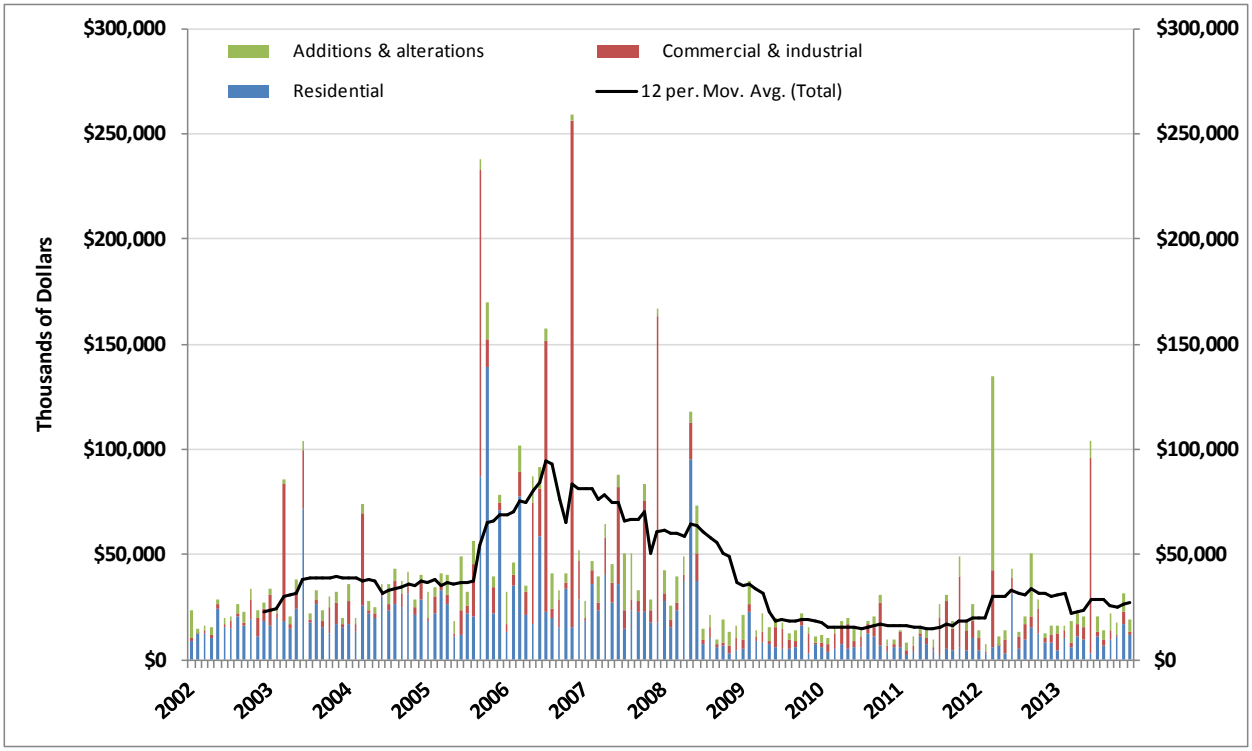
The 2013 value of Maui County total private permits is down 11.4 percent over 2012. The Commercial and Industrial category actually had a very strong year, with a 45.9 percent increase over 2012. This increase was mainly due to a Maui Hyatt Vacation Club project, which included a $75 million permit for a hotel building and a $12 million permit for a pool and spa. However, the drag on 2013 growth was the Additions and Alterations category, which is down 52.1 percent over the same period of 2012. As discussed above, photovoltaic permits are included in this category and the decline is partially due to changes in the solar tax credit law. The Residential category is down 2.1 percent over the same period of 2012 (Table 5).

Table 5. Maui County Private Building Permit Values in 2013: Percentage Share and Growth

Category	% of Total	% Growth from 2012
Residential	34.4%	-2.1%
Commercial & Industrial	42.2%	45.9%
Additions & Alterations	23.4%	-52.1%
Total	100%	11.4%

In looking at the 12 month moving averages in Figure 9, the value of permits declined sharply in mid-2008 and the post recession recovery has been up and down since then. In 2013, June was a phenomenal month for Maui with $104 million in private building permits mainly due to the Maui Hyatt Vacation Club project. However, it appears that Maui's recovery is still moving at a slow pace with the 2013 average excluding June being $20.06 million.

Figure 9. Maui County Monthly Value of Private Building Permits



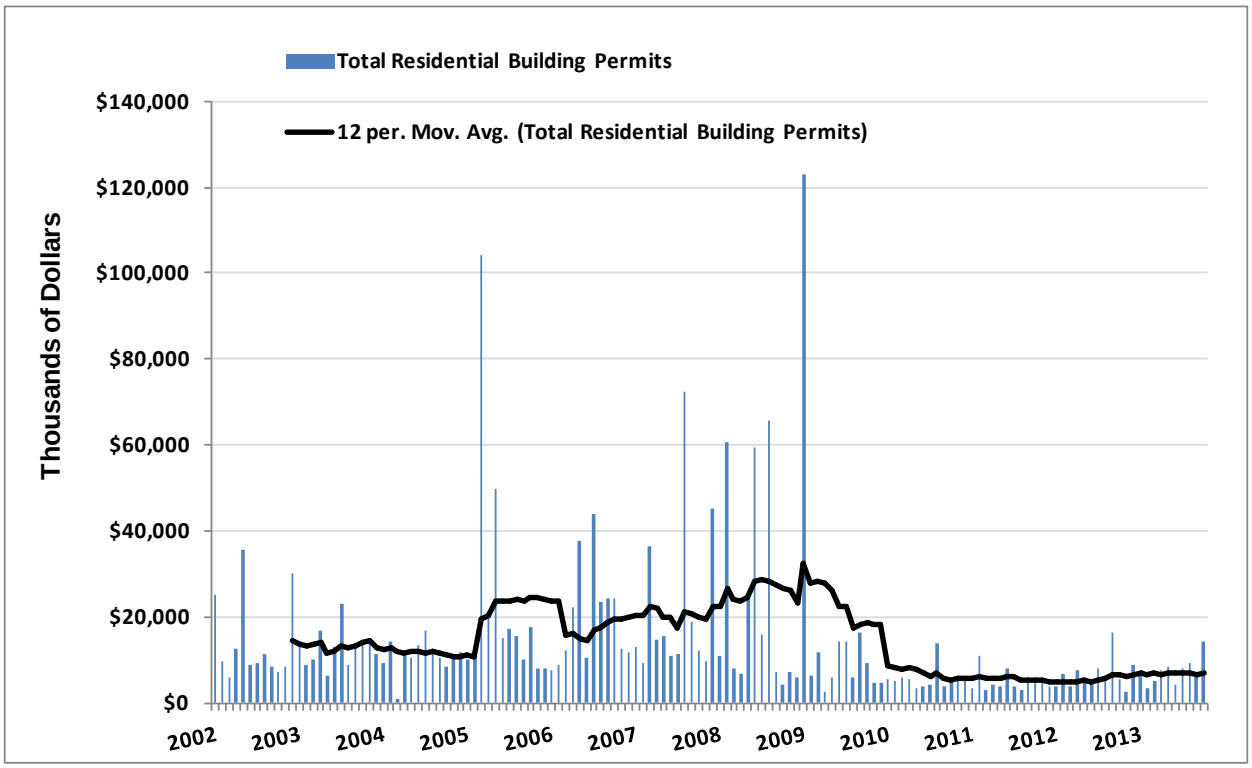
Source: DBEDT Monthly Economic Indicators 2013

Kauai County Private Building Permits

The value of Kauai County's residential building permits for 2013 was $85.4 million, a 6.8 percent increase over 2012. Kauai County's recovery has also been more gradual than Honolulu County's recovery and the value of building permits is still substantially below pre-recession levels. The monthly average permit value from 2003 through 2007 was $18.0 million and from 2008 through 2013 the average declined to $11.0 million.

The Kauai County data includes only residential permits so the respective values of the other categories are not included in the chart below. In looking at the 12 month moving averages below, the trend line is fairly flat indicating a slow recovery (Figure 10). However, 2013 showed an improvement and the upward trend appears to be continuing into 2014.

Figure 10. Kauai County Monthly Value of Residential Building Permits



Source: DBEDT Monthly Economic Indicators 2013

2.5 State Capital Improvement Project Expenditures

State Capital Improvement Project (CIP) expenditures are a barometer for the state's capital outlays for construction projects. During the 2007-2013 period, the average annual CIP expenditures by the state government was $1.1 billion, indicating that the state government used construction projects as a means to stabilize the economy. During the construction downturn between 2008 and 2011, state CIP expenditures accounted for a stable 16 percent of the total construction value. In 2013, the value of CIP expenditures was 1.2 billion, which was a decrease of 11.6 percent over 2012.

Table 6. Hawaii State Capital Improvement Project Expenditures ($ thousands)

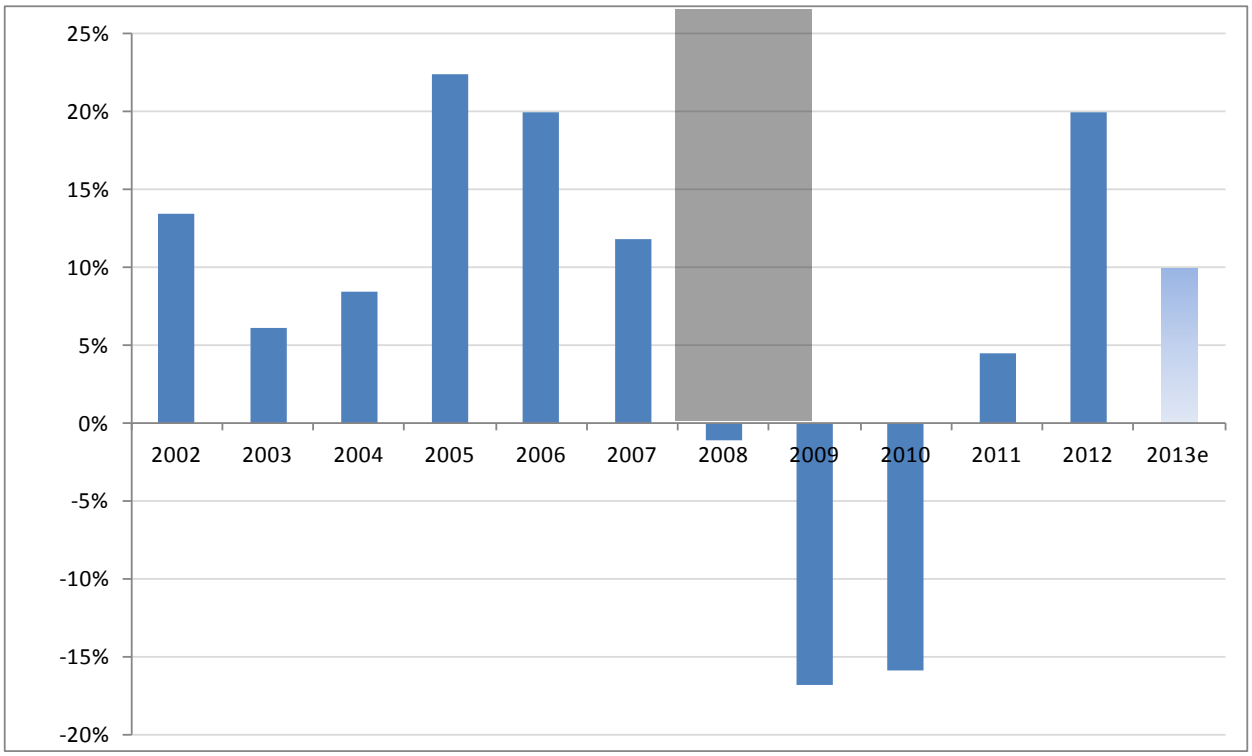
Year	Expenditures ($ thousands)	% Change
2002	$654,804	7.1%
2003	$847,667	29.5%
2004	$400,707	-52.7%
2005	$765,953	91.2%
2006	$652,664	-14.8%
2007	$1,131,450	73.4%
2008	$980,061	-13.4%
2009	$1,102,080	12.5%
2010	$1,052,636	-4.5%
2011	$1,004,491	-4.6%
2012	$1,300,621	29.5%
2013	$1,150,213	-11.6%

Source: DBEDT Quarterly Statistical and Economic Report February 2014

2.6 State Contracting Tax Base

The contracting tax base is an important indicator of the construction industry and is often referred to as the value of construction completed. Reflecting the overall business cycle in Hawaii, the contracting tax base declined for three consecutive years starting in 2008. The pre-recession year over year tax base growth had been strong with the 2005 peak growing at 22.4 percent over the previous year (Figure 11). However, as the recession hit, the year over year contracting tax base growth turned negative and from 2008 through 2010 the tax base declined. The contracting tax base has steadily increased as the economy has recovered with 2011 up 4.4 percent, 2012 up 20.0 percent, and 2013 up an estimated 10.0 percent.

Figure 11. State Contracting Tax Base Annual Growth



Source: DBEDT Quarterly Statistical and Economic Report February 2014
2013 figure is an annualized estimate based on the first three quarters
/shaded area is Great Recession from Q4 2007 to Q2 2009 (12/2007 to 6/2009)

In looking at total value, the contracting tax base peaked in 2007 at $8.1 billion and by 2010 had declined to $5.6 billion (Table 7). The 2013 annualized estimate based on third quarter year to date growth is $7.7 billion, which is slightly below the 2007 peak of $8.1 billion.

Table 7. State of Hawaii Contracting Tax Base

	First Qtr	*Second Qtr*	*Third Qtr*	*Fourth Qtr*	***Annual***
			$ thousands		
2002	$913,738	$1,025,016	$1,213,709	$1,122,492	$4,274,956
2003	$1,122,284	$1,139,346	$1,179,566	$1,095,127	$4,536,323
2004	$1,143,340	$1,126,029	$1,345,886	$1,306,258	$4,921,512
2005	$1,440,933	$1,429,833	$1,608,131	$1,545,100	$6,023,997
2006	$1,714,742	$1,677,120	$1,920,215	$1,911,257	$7,223,334
2007	$1,990,972	$2,081,107	$1,924,935	$2,075,898	$8,072,912
2008	$1,885,061	$1,977,543	$2,095,930	$2,028,592	$7,987,126
2009	$1,779,892	$1,726,610	$1,580,058	$1,555,100	$6,641,660
2010	$1,426,981	$1,301,908	$1,487,692	$1,373,185	$5,589,766
2011	$1,382,930	$1,443,626	$1,468,186	$1,542,702	$5,837,445
2012	$1,561,390	$1,680,769	$1,858,493	$1,905,481	$7,006,133
2013e	$1,847,561	$1,935,348	$1,844,945	N/A	$7,706,746

Source: DBEDT Quarterly Statistical and Economic Report February 2014
2013 figure is an annualized estimate based on the first three quarters

2.7 The Honolulu Construction Cost Indices

The Honolulu Construction Cost Indices serve as a price barometer for construction industry inputs. The original Honolulu Construction Cost Indices were developed in 1947 by the Builders Report Pacific publication and this organization continued publishing the index until 1969. The indices were then compiled and published by First Hawaiian Bank until 1997, when they discontinued compiling the construction index figures. It was then that DBEDT took over the Honolulu Construction Cost Indices and DBEDT continues to compile and publish these figures.

The indices were designed as a proxy to measure the costs to builders of typical building materials and public-contract labor. However, the indices do not include the costs of contract overhead and profit, site preparation, utilities-installation, and overtime labor. The indices estimate the current cost of materials and labor for the following two types of construction:

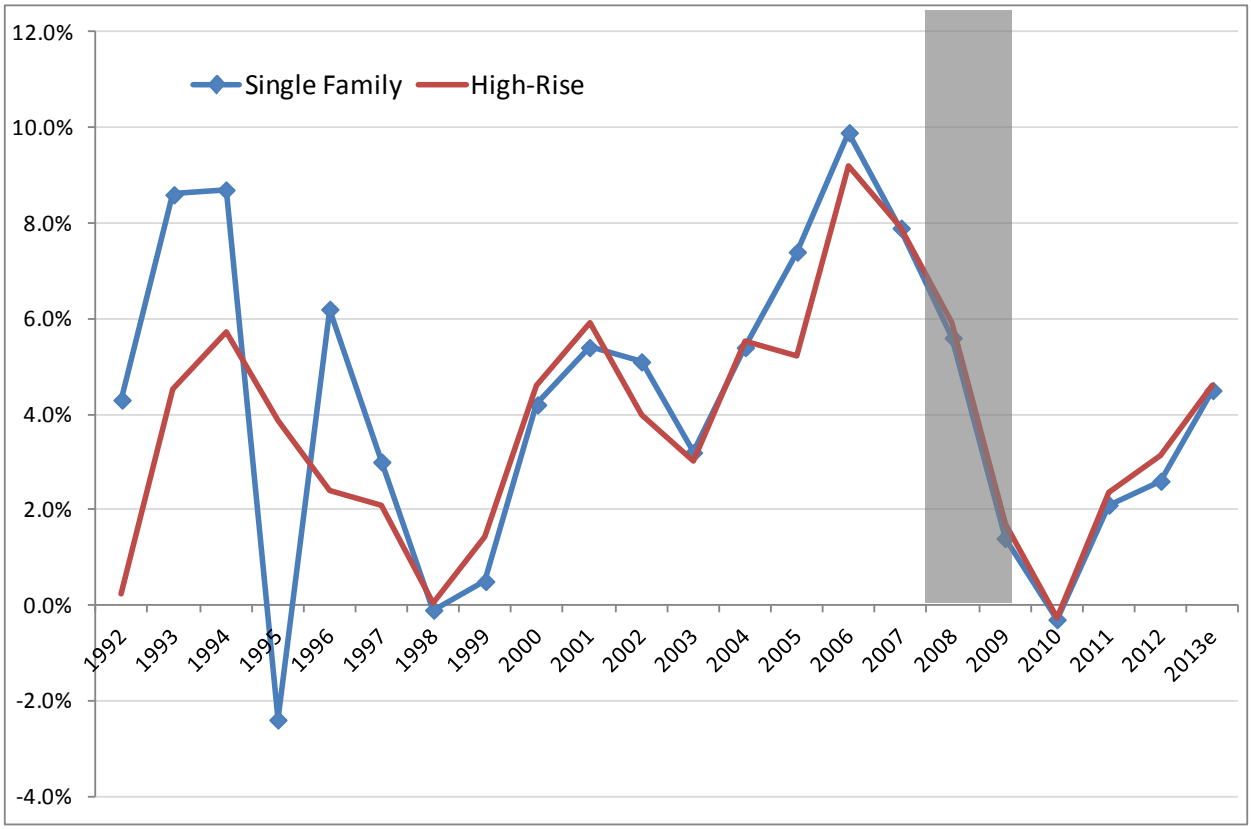
Single Family Residence: This index is calculated for a typical 1,300 square foot single family house with a concrete slab floor. This includes eight types of building materials: lumber, roofing shingles, cement, copper pipe, electrical wire, drywall, glass, and paint.
The wage component is made up of ten major labor construction including carpenters, electricians, laborers I & III, lathers, masons, painters, plasterers, plumbers, and roofers.

High Rise Condominiums or Office Buildings: The high rise condominium or office building index is similar to the single family residence index with some additions and different proportions. This index includes reinforcing steel and five additional labor groups: boilermaker, tile-setters, structural and reinforcing ironworkers, and heavy equipment operators.

The labor and materials component are weighted for each type of construction based on estimates of amount of the item used in each type of construction. The base for the indices is January 1992 = 100.

Figure 12 shows the annual percent change over the previous year for both indices. Since the late 1990's the indices have generally moved together, with both indices reaching a pre-recession peak in 2006 of 10 percent growth over the previous year. The percent change then declined through the recession until it reached a trough in 2010, when both indices decreased 0.3 percent over the previous year. Since 2010, both price indices have been increasing steadily and this trend appears to be continuing. As of the third quarter 2013, the average index increase for Single Family Residence and High Rise Condominiums or Office Buildings were 4.5 percent and 4.6 percent respectively.

Figure 12. Annual Percentage Change of Honolulu Construction Cost Indices



Source: DBEDT 2013
/shaded area is Great Recession from 12/2007 to 6/2009

2.8 Major Construction Projects of 2013

In looking at 2013, Hawaii had many construction projects that were permitted. The table below lists construction projects of $5 million or more that had been permitted in 2013. Residential construction was strong in 2013 and several large scale projects that exceeded $5 million were permitted. The largest of these was a residential complex located at 1189 Waimanu St in Kakaako, Honolulu. This is a $109.9 million residential high rise that was permitted in January. The next largest was also a Kakaako residential project located at 801 South Street, with a permit value of $105 million. Other projects included town homes in Ewa Beach for $37 million, town homes in Kapolei for $34.6 million, and the Hale Mohalu senior living facility for $12.2 million.

The commercial sector also contributed to construction with strong demand from the tourism, retail, and health care sectors. Leading tourism construction was the Maui Hyatt Vacation Club which received a combined total of $87 million for a hotel building and pool and spa construction. Another notable project was Hawaiian Airlines, which received a $10 million permit for their facility near the airport at 3375 Koapaka Street. Retail development was also a strong contributor to the commercial construction sector. The project that is leading this category is the Ala Moana Center expansion and renovation. The two largest Ala Moana projects were the Ala Moana Center for $43.8 million and the Ala Moana Building for $63.5 million. The health care industry was led by Kaiser, which received a permit to update their medical facilities for $22.8 million. The Comprehensive Health Care Center in Waianae received a permit to update their facilities for $5 million.

In the government category, the Sand Island Wastewater Treatment plant received a $19.9 million permit for the expansion of their facilities. There was also significant demand from the education sector as Hawaii's educational institutions applied for permits to renovate and add capacity. This category was led by the University of Hawaii Manoa Campus receiving a $23.7 million permit for the Clarence T.C. Ching Athletics Complex. This will be a three story complex with seating for approximately 2,500. The campus is also renovating existing facilities with a $6.2 million permit for work on Sakamaki Hall and a $5.1 permit for work on Snyder and Edmonson Halls. There was also construction at the K12 level. Kailua High School received a $6.2 million permit for a natural science lab and Waipahu Elementary received an $8.6 million permit for classroom and parking construction.

Table 8. Major Projects Permitted in 2013

Island	Category	Project	Permit Value ($M)
Oahu	Residential	High-rise condo at Waimanu Street, Kakaako	109.9
Oahu	Residential	Tower A, Kakaako, 801 South Street Condo	105.0
Oahu	Residential	Town Homes in Kapolei	34.6
Oahu	Residential	4 Town home projects in Ewa Beach	37.0
Oahu	Residential	Assisted-Living rental complex in Pearl City	16.0
Hawaii	Residential	Residential Building in Kailua-Kona	5.0
Maui	Residential	Residential Building in Kihei	3.7
Oahu	Residential	Building renovation/addition for Waialae Hale	5.1
Oahu	Residential	New senior rental building, Hale Mahalu II	12.2
Hawaii	Residential	Apartment alterations and repair, BIHF Riverside	6.2
Hawaii	Residential	Building renovation/addition at 720-326 Halihali Place	6.0
Maui	Residential	Main Dwelling/Pool Deck at Waterous Residence	4.4
Hawaii	Residential	Residential Dwelling at 7322-30 Ala Kohanaiki HI 73065	4.3
Hawaii	Residential	Kaumana Drive new nursing homes	7.4
Oahu	Commercial	Ala Moana 1555 Kapiolani construction	20.0
Oahu	Commercial	Ala Moana 1450 construction	43.8
Oahu	Commercial	Ala Moana Building renovation	63.5
Oahu	Commercial	Ala Moana parking expansion	9.8
Maui	Commercial	Foodland Supermarket at Kihalani	6.1
Oahu	Commercial	Downtown Honolulu Wal-Mart	6.0
Oahu	Commercial	Office building, Hawaiian Airlines	10.0
Hawaii	Commercial	New Cafeteria, Hawaiian Home Lands	4.8
Oahu	Commercial	Office building addition/alteration in Aiea	7.5
Oahu	Commercial	Target Supermarket in Kailua	15.0
Hawaii	Commercial	Kaiser Hospital building renovations	22.8
Oahu	Commercial	Kaiser Mapunapuna Medical Office renovations	6.5
Oahu	Commercial	Waianae Coast Comprehensive Health Center Building Additions	5.0
Maui	Commercial	Maui Memorial Medical Center, building alterations	6.0
Maui	Commercial	Hotel alteration, Fairmont Kea Lani Resort	5.0
Oahu	Commercial	Illikai Hotel, Hotel alteration	5.3
Oahu	Commercial	Hyatt Regency Waikiki Hotel additions/alterations	6.0
Maui	Commercial	Maui Hyatt Vaction Timeshare	87.3
Hawaii	Commercial	HMSA office building, Big Island	8.0
Oahu	Commercial	Rengo Packaging Factory	16.0

Source: County Building Departments

Table 8. Major Projects Permitted in 2013 (cont.)

Island	Category	Project	Permit Value ($M)
Oahu	Government	New classrooms and renovations, UH Manoa	23.7
Hawaii	Government	Student housing renovation, UH Hilo	9.0
Oahu	Government	Campus alterations, Windward Community College	4.4
Oahu	Government	New High School building and renovation, Waipahu Elementary and Kailua High School	14.8
Oahu	Government	Honolulu Authority for Rapid Transportation (HART)	64.7
Oahu	Government	Wastewater treatment at Kaneohe Bay, City and County of Honolulu	6.0
Oahu	Government	Police State in Waianae, City and County of Honolulu	13.4
Hawaii	Government	Office building renovations, State of Hawaii	30.3
Oahu	Government	Sand Island Parkway Sewage Treatment Plant	19.9

Source: County Building Departments

In looking towards the future, there are two projects that will have major impacts on the construction industry's contribution to the economy: the Honolulu rapid transit rail project and the Kakaako area development. After a series of legal delays, the Honolulu Authority for Rapid Transportation (HART) has started construction on major projects. In September 2013, a $64.7 million permit was granted for construction related to train tracks, parking lots, utilities, and drainage structures. This momentum will continue in 2014 as more projects break ground. The total estimated cost for the rail is $5.1 billion which can be broken down as follows (HART 2013):

- $4.3 billion in design, engineering, building, and other costs
- $644 million in contingency allowance
- $174 million in finance charges

There are many parts to the rail project, but the major components are the projected 282 columns, 21 stations, and 20 miles of elevated track that are outlined on the map below (Figure 13).

Figure 13. Map of Honolulu Rail Route and Transit Stations

Source: Honolulu Authority for Rapid Transportation

The overall construction project can be broken down into a series of contracts that have been awarded to cover various areas including design and engineering, construction, and operation. As of November 2013, twelve major contracts have been awarded (Table 9). The total committed amount as of November 29, 2013 is $2.5 billion and the actual incurred amount is $812 million. It is important to note that a portion of the costs incurred to date are for non-construction costs including land acquisition (HART 2013). A majority of construction costs incurred to date have been on the West Oahu side, with the West Oahu Farrington project incurring $194 million to date.

Table 9. Major Rail Contracts Awarded as of November 2013

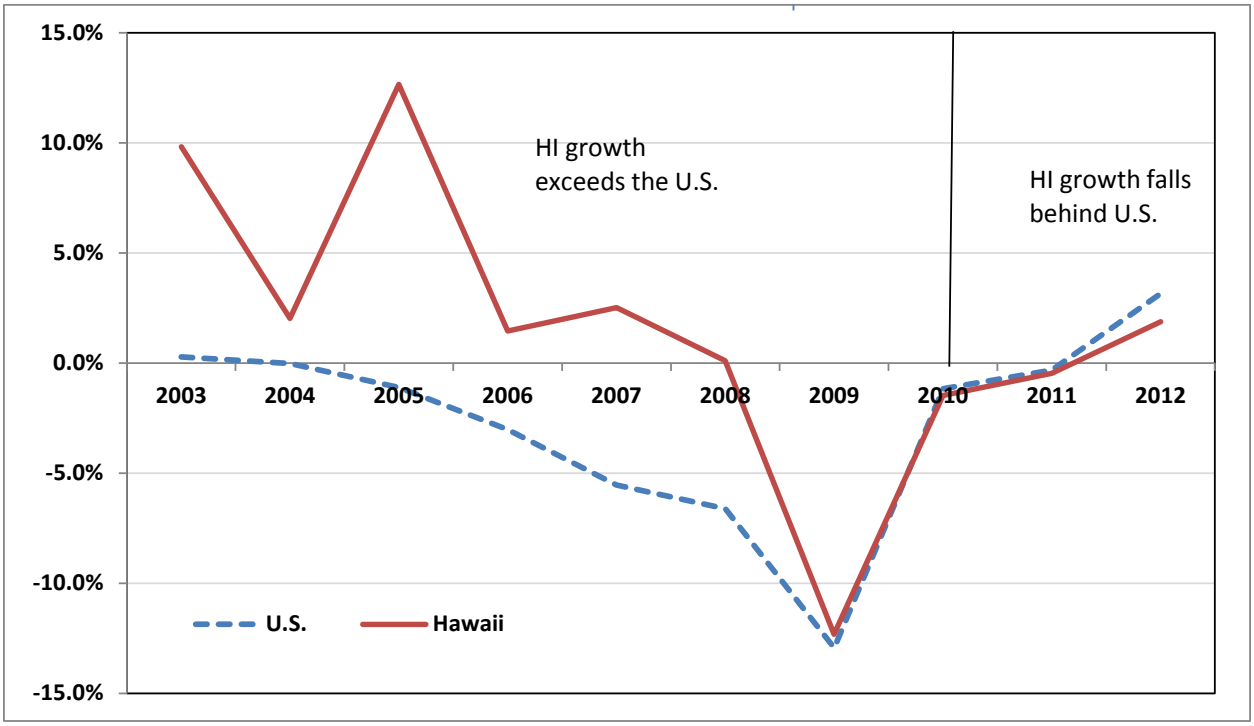
Contract	Category	Funds Committed	Incurred to Date
West Oahu/ Farington Highway Guideway	Design & Build	$ 556,771,464	$194,225,316
Maintenance & Storage Facility	Design & Build	$ 225,268,244	$56,428,287
Kamehameha Highway Guideway	Design & Build	$ 378,860,981	$85,977,378
Core Systems Contract	Design, Build, Operate, Maintain	$ 602,950,143	$54,631,216
West Oahu Station Group Construction Design	Engineering & Design	$ 7,812,928	$5,575,886
Farrington Highway Station Group Design	Engineering & Design	$ 12,208,045	$8,929,191
Kamehameha Highway Station Group Design	Engineering & Design	$ 8,702,592	$7,237,220
Airport Section Guideway & Utilities Design	Engineering & Design	$ 39,829,032	$27,828,852
Airport Station Group Design	Engineering & Design	$ 10,177,365	$6,791,408
City Center Section Guideway & Utilities Design	Engineering & Design	$ 44,481,020	$16,237,428
Dillingham & Kakaako Station Group Final Design	Engineering & Design	$ 18,321,918	$1,620,589
Elevators & Escalators Install/Maintain	Design & Build	$ 50,982,714	$0
Estimated Other Expenses*		$ 500,633,554	$346,517,229
TOTAL		**$ 2,457,000,000**	**$812,000,000**

Source: Honolulu Authority for Rapid Transportation Progress Report Various 2013
* other estimated expenses include expenses outside of major contracts such as support services, land parcel purchases, and utility relocation.

Along with the rail project, the Kakaako area development is gaining momentum and will contribute significantly to the construction industry in the coming years. This 600 acre area is being developed as an "urban village" neighborhood that is pedestrian friendly with access to public spaces. The development includes five housing developments that are under construction, six that received permits in 2013, and an additional six that are in the planning stages. The seventeen total planned buildings will provide an estimated 5,740 housing units.

The construction industry ranks within the top ten industries in Hawaii. The value of this industry can be seen in the fact that it has a high number of jobs coupled with relatively high wages. As with the rest of the U.S., Hawaii's construction industry was hit hard during the recession. In looking at the past ten years, Hawaii's construction industry real GDP growth exceeded that of the U.S. from 2003 through 2009 (Figure 14). However, since 2010, Hawaii's construction industry growth has lagged slightly behind that of the U.S., with 2012 Hawaii growth at 1.9 percent and the U.S. at 3.2 percent.

Figure 14. Hawaii and U.S. Construction Industry Real GDP Growth



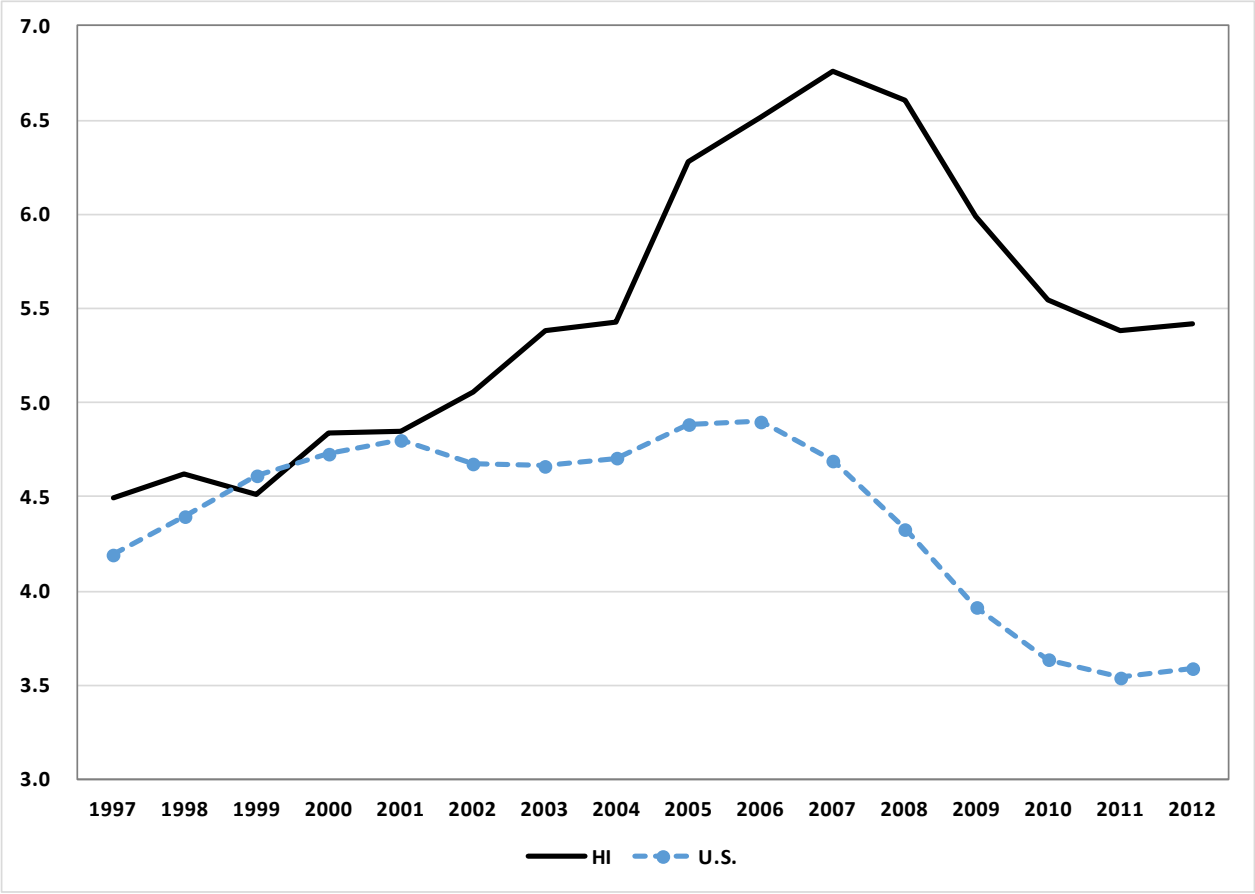
Source: U.S. Bureau of Economic Analysis

3.1 Hawaii Construction Industry's Direct Contribution to Nominal GDP

The construction industry composes a relatively larger portion of the economy in Hawaii than the nation as a whole. From 1997 to 2012, the construction industry, on average, accounted for 5.5 percent of total nominal GDP in Hawaii, about 1.3 percentage points above the U.S. figure of 4.3 percent.

The contribution of the construction industry to total GDP has varied over time in both Hawaii and the U.S. However, the fluctuations were more significant in Hawaii than those of the U.S. In Hawaii, the construction industry's share of total GDP increased from 4.5 percent in 1997 to a peak of 6.8 percent in 2007. The share then decreased to 5.4 percent by 2012. For the U.S., the share of the construction industry to total GDP increased from 4.2 percent in 1997 to a peak of 4.9 percent in 2006 and then decreased to 3.6 percent in 2012 (Figure 15).

Figure 15. Construction Industry's Direct Contribution to Nominal GDP (percentage)



Source: U.S. Bureau of Economic Analysis

From 1997 to 2012, the average annual growth rate of the construction industry's real GDP was lower than that of the total real GDP in both Hawaii and the nation; but the difference was smaller in Hawaii. As shown in Table 10, from 1997 to 2012, the average annual growth rate of the construction industry's real GDP was 0.8 percent in Hawaii, about 0.9 of a percentage point below the total real GDP growth rate in Hawaii. However, for the nation, the average growth rate of construction industry's real GDP was a negative 1.5 percent, 3.6 percentage points below the total real GDP growth rate for the nation.

Table 10. Construction Industry GDP for Hawaii and U.S.

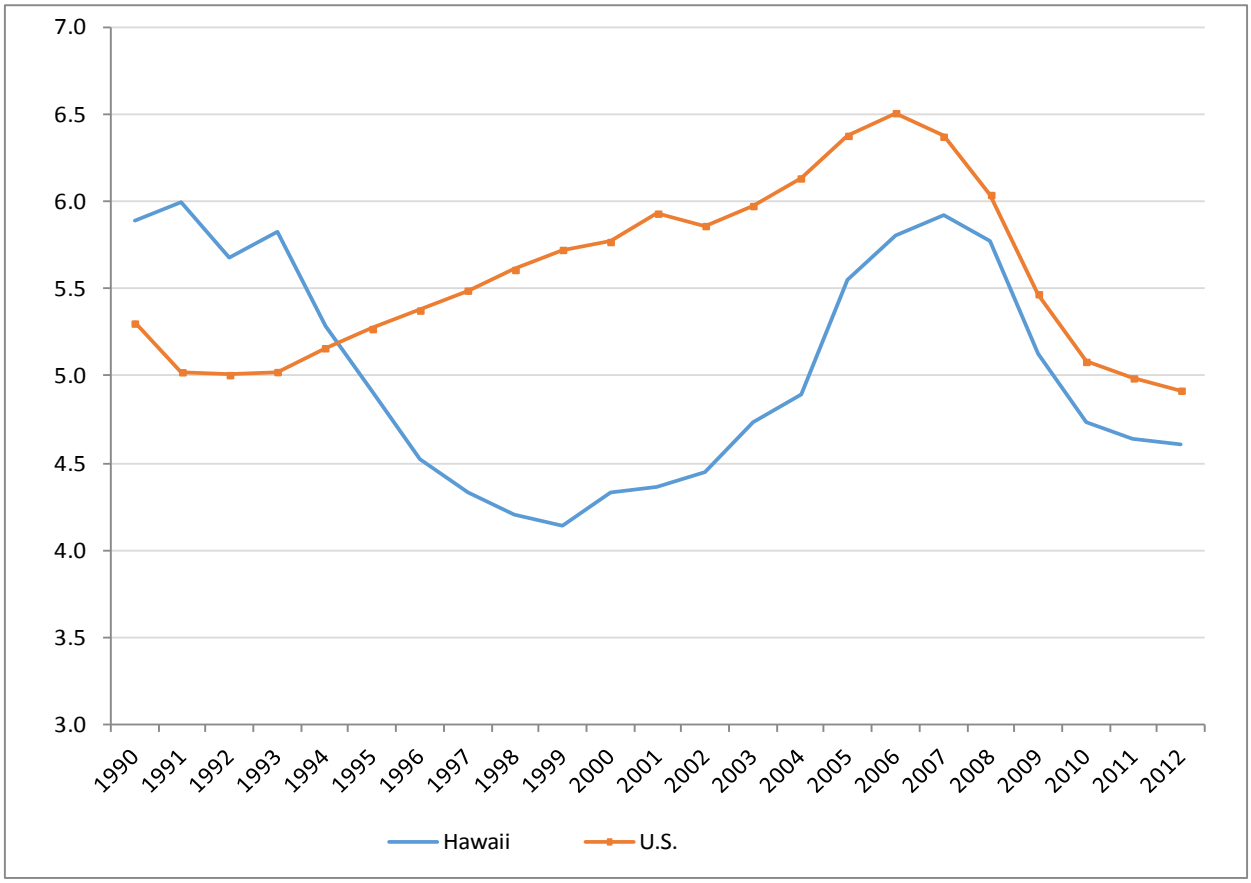
	Construction Industry ($millions)				All Industries ($millions)				% of Construction Industry			
	Hawaii GDP	Hawaii Real GDP	U.S. GDP	U.S. Real GDP	Hawaii GDP	Hawaii Real GDP	U.S. GDP	U.S. Real GDP	Hawaii GDP	Hawaii Real GDP	U.S. GDP	U.S. Real GDP
1997	1,710	2,875	346,739	582,939	38,031	48,395	8,270,462	9,856,166	4.5	5.9	4.2	5.9
1998	1,758	2,758	383,658	601,970	38,019	47,158	8,727,023	10,281,034	4.6	5.8	4.4	5.9
1999	1,773	2,627	428,385	634,618	39,332	47,545	9,286,858	10,771,147	4.5	5.5	4.6	5.9
2000	2,007	2,813	467,308	655,162	41,450	48,819	9,884,171	11,225,406	4.8	5.8	4.7	5.8
2001	2,060	2,688	490,525	640,308	42,529	48,444	10,218,019	11,365,110	4.8	5.5	4.8	5.6
2002	2,264	2,830	494,328	617,926	44,752	49,595	10,572,388	11,559,801	5.1	5.7	4.7	5.3
2003	2,588	3,108	516,071	619,635	48,095	51,684	11,067,829	11,809,034	5.4	6.0	4.7	5.2
2004	2,836	3,171	554,197	619,470	52,290	54,304	11,774,410	12,199,532	5.4	5.8	4.7	5.1
2005	3,572	3,572	612,524	612,524	56,901	56,901	12,539,116	12,539,116	6.3	6.3	4.9	4.9
2006	3,971	3,624	650,970	594,038	60,993	58,743	13,289,235	12,875,816	6.5	6.2	4.9	4.6
2007	4,328	3,715	653,786	561,109	64,070	59,548	13,936,199	13,103,341	6.8	6.2	4.7	4.3
2008	4,359	3,719	614,204	523,996	65,978	60,098	14,193,120	13,016,791	6.6	6.2	4.3	4.0
2009	3,881	3,261	542,891	456,269	64,787	57,902	13,869,678	12,592,668	6.0	5.6	3.9	3.6
2010	3,729	3,213	523,334	450,940	67,274	59,673	14,388,813	12,897,088	5.5	5.4	3.6	3.5
2011	3,768	3,198	529,545	449,519	70,006	60,899	14,959,778	13,108,318	5.4	5.3	3.5	3.4
2012	3,925	3,258	558,746	463,697	72,424	61,877	15,566,077	13,430,576	5.4	5.3	3.6	3.5
Average	3,033	3,152	522,951	567,758	54,183	54,474	12,033,949	12,039,434	5.5	5.8	4.4	4.8
Growth 97-12	5.7%	0.8%	3.2%	-1.5%	4.4%	1.7%	4.3%	2.1%				

Source: U.S. Bureau of Economic Analysis
Real GDP base year = 2005

Due to differences in labor productivity, as measured by GDP per job, the U.S. construction industry contributes more in employment than that of Hawaii. From 1990 to 2012, the average contribution of the construction industry in total jobs was 5.0 percent in Hawaii and 5.6 percent for the nation as a whole.

In Hawaii, the percentage of construction jobs as a percentage of total jobs decreased from about 6.0 percent in 1991 to a low of 4.1 percent in 1999, increased to about 6.0 percent in 2007, and then decreased to 4.6 percent in 2012. For the nation, the percentage of construction jobs as a percentage of total jobs increased from about 5.0 percent in 1991 to a peak of 6.5 percent in 2006, and then decreased to 4.9 percent in 2012 (Figure 16).

Figure 16. Construction Industry's Direct Contribution to Total Jobs (percentage)



Source: U.S. Bureau of Economic Analysis

Based on the most recent data available, from 1990 to 2012, the average annual job growth of construction jobs was lower than that of overall job growth in both Hawaii and the nation; but the difference was larger in Hawaii. As shown in Table 11, from 1990 to 2012, the average annual growth rate of Hawaii's construction jobs was a negative 0.3 percent or about 1.1 percentage points below the Hawaii's total job growth rate.

However, the average growth rate of construction jobs for the nation was 0.8 percent, only 0.4 of a percentage point below the total job growth rate for all sectors.

Table 11. Construction Industry Jobs in Hawaii and the U.S.

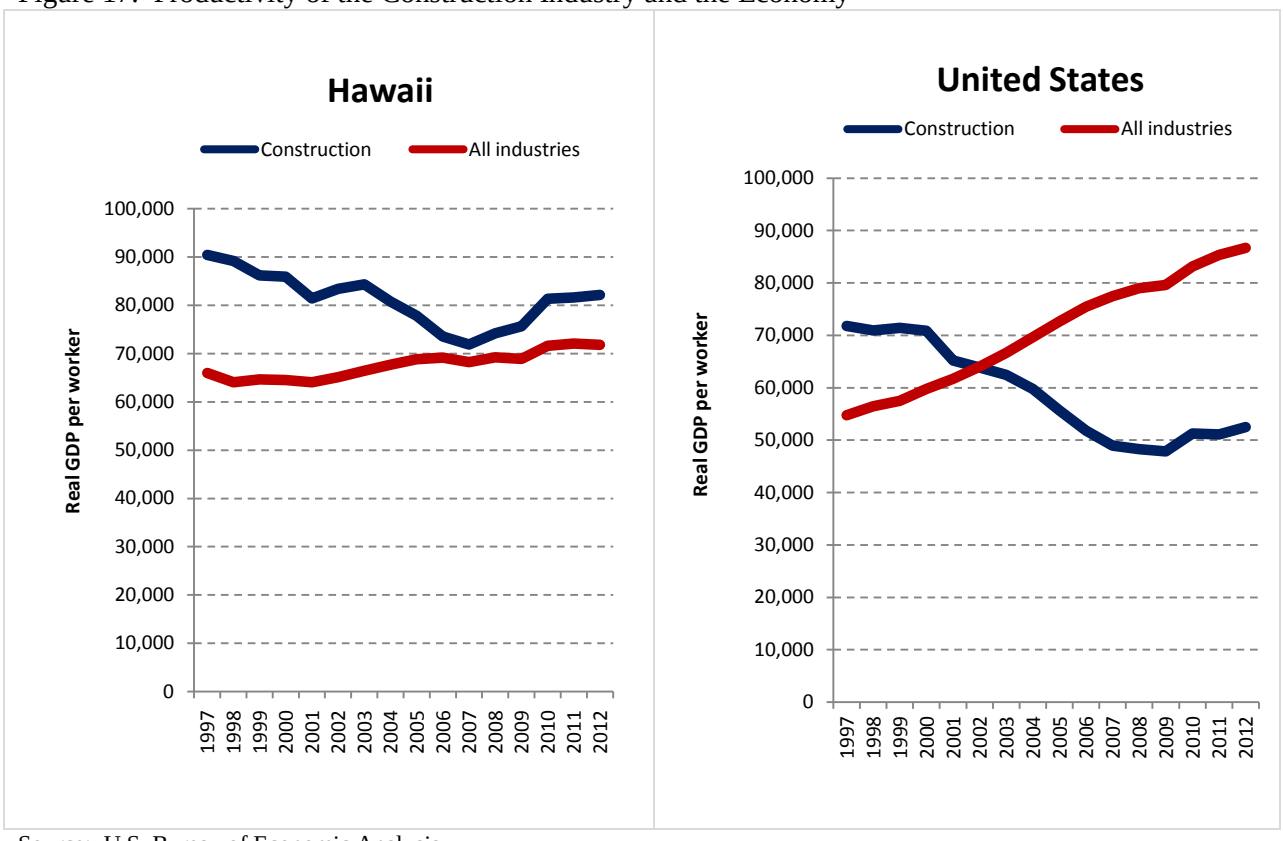
	Construction Industry		All Industries		% of Construction Industry	
	Hawaii Jobs	U.S. Jobs	Hawaii Jobs	U.S. Jobs	Hawaii	U.S.
1990	42,691	7,333,600	724,262	138,330,900	5.9	5.3
1991	44,675	6,911,500	745,447	137,612,800	6.0	5.0
1992	42,394	6,916,600	746,137	138,166,100	5.7	5.0
1993	43,174	7,071,900	741,780	140,774,400	5.8	5.0
1994	38,922	7,440,700	736,771	144,196,600	5.3	5.2
1995	36,067	7,795,200	734,039	147,915,800	4.9	5.3
1996	33,201	8,120,900	733,396	151,056,200	4.5	5.4
1997	31,778	8,484,500	733,761	154,541,200	4.3	5.5
1998	30,932	8,888,800	736,013	158,481,200	4.2	5.6
1999	30,469	9,245,300	735,163	161,531,300	4.1	5.7
2000	32,746	9,540,300	756,682	165,370,800	4.3	5.8
2001	33,023	9,817,700	756,549	165,519,200	4.4	5.9
2002	33,921	9,678,800	761,931	165,158,100	4.5	5.9
2003	36,844	9,920,300	778,163	166,026,500	4.7	6.0
2004	39,265	10,367,600	802,392	169,036,700	4.9	6.1
2005	45,869	11,004,800	826,693	172,556,400	5.5	6.4
2006	49,296	11,460,900	848,970	176,116,600	5.8	6.5
2007	51,666	11,462,000	872,430	179,874,700	5.9	6.4
2008	50,128	10,847,800	867,826	179,643,900	5.8	6.0
2009	43,113	9,529,900	840,236	174,225,700	5.1	5.5
2010	39,490	8,793,700	833,390	173,043,700	4.7	5.1
2011	39,181	8,794,800	844,492	176,341,700	4.6	5.0
2012	39,647	8,830,900	861,588	179,613,300	4.6	4.9
Average	39,500	9,054,717	783,396	161,527,557	5.0	5.6
Growth 90-12	-0.3%	0.8%	0.8%	1.2%		

Source: U.S. Bureau of Economic Analysis

3.2 Construction Labor Productivity

The labor productivity of Hawaii's construction industry (as measured by real GDP per job) is higher than the national average. Additionally, Hawaii's construction labor productivity is higher than the average of all industries. From 1997 to 2012, the average real GDP per job in Hawaii's construction industry was $81,187, which was approximately 38.4 percent higher than that of the nation. This value was about 20.5 percent higher than the average real GDP per job for all industries in Hawaii. However, for the nation the average real GDP per job in the construction industry was only $58,669, about 16.8 percent lower than the average real GDP per job for all industries in the nation. As shown in Figure 17, Hawaii's construction industry labor productivity was above the average labor productivity of all industries in Hawaii for all years from 1997 to 2012. The gap decreased from 1997 to 2007, and then increased from 2007 to 2012. For the nation, the labor productivity of the construction industry was above the average labor productivity of all industries from 1997 to 2000. However, from 2001 the construction industry's labor productivity decreased below the average labor productivity of all industries and this gap continued to increase.

Figure 17. Productivity of the Construction Industry and the Economy



Source: U.S. Bureau of Economic Analysis

3.3 Construction Industry's Economic Impact

The construction industry stimulates a large amount of economic activity that has a ripple effect on other industries. This effect can be measured by the construction Industry's multipliers. According to the 2007 State of Hawaii Input-Output Model, the construction industry's final demand output multiplier is 2.08. In other words, the total economic impact of $1 million in construction spending results in an estimated $2.08 million of total output (Table 12). Furthermore, Hawaii's households would receive an estimated $600,000 in earnings and the state government would gain $110,000 in tax revenue for each $1 million in construction spending. In addition, the final demand total job multiplier in 2014 is 10.0. In other words, $1 million in construction spending in 2014 will create an estimated 10 jobs in Hawaii.

Table 12. Construction Industry Output Multipliers

Category	Multiplier	Impact of $1 million Construction Spending
Output	2.08	$2,080,000
Household Income	0.6	$600,000
State Taxes	0.11	$110,000

Source: DBEDT Input-Output Model

In order to illustrate the multiplier effect, let's use the construction of a commercial building as an example. The various inputs required to construct this building include intermediate input from Hawaii industries including architectural design (professional services), building materials (manufacturing), shipping and delivery (transportation), bank loans (finance) and other inputs imported from out of state. Once the building is completed, further economic activity is generated with transactions including agents, lawyers, accountants, and consultants that are hired to facilitate the business and legal activity associated with the building.

Table 13. Percentage Share of Inter-Industry Output

Industry	Output Share
Real estate and rentals	40.7%
Accommodations	13.1%
Government	11.4%
Eating and drinking	6.7%
Transportation	5.3%
Utilities	2.7%
Health services	2.7%
Other services	2.5%
Retail trade	2.4%
Educational services	2.2%
Finance and insurance	2.1%
Mining and construction	2.1%
Other	6.1%

Source: DBEDT Input-Output Model

The building itself is then utilized by other sectors of the economy including real estate, accommodations, government, food service, and retail establishments and this is called inter-industry output. The inter-industry output is the amount of output generated from the construction industry that is used by other industries in the state (Table 13). In addition to inter-industry output, there is the final demand sector of the Input-Output model which includes residents, visitors, and government.

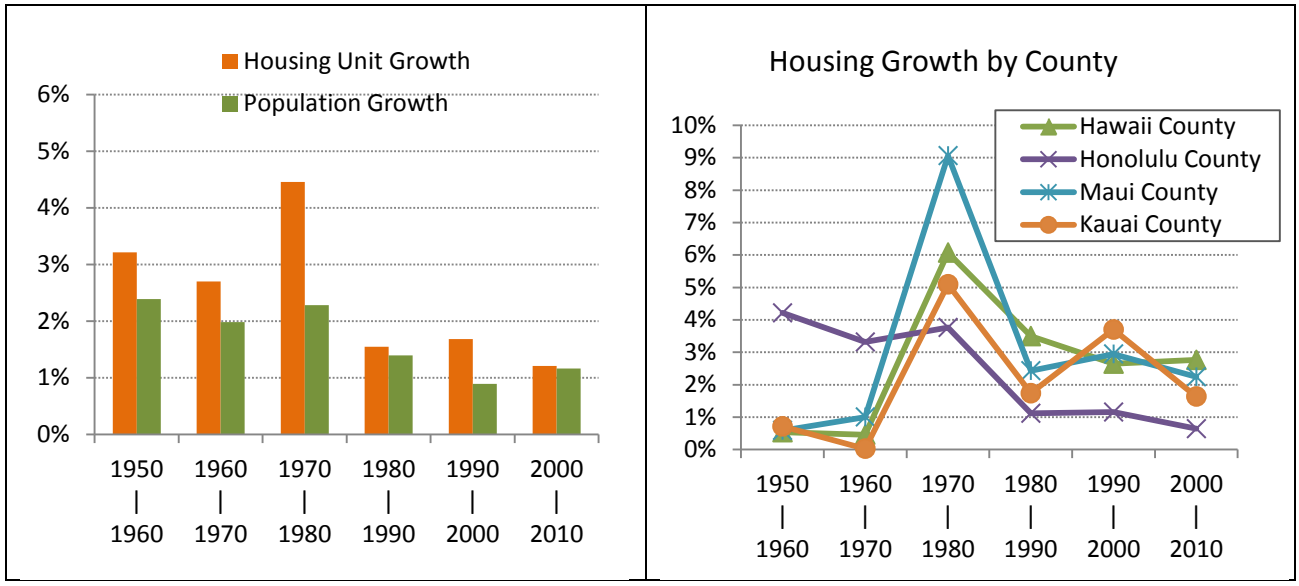
4. Housing Supply and Demand in Hawaii

There have been a number of studies conducted on the housing market focusing on what determines demand in housing market and how the market price has been responsive to the demand change. Income and job growth, mortgage rate, tax structure, credit market constraints, consumer confidence, and expectation of future housing price movements have been discussed as major factors that impact the demand. This is homeownership demand, which is somewhat different from housing stock demand. Demand for housing stock is related to how many housing units are needed to accommodate every household adequately in a given region regardless if a household owns or rents. Demand for housing stock is determined by long-term factors such as population growth, household formation patterns, and other ownership behaviors. This section examines historical trends of these factors and attempts to estimate how many additional housing units are required annually to meet Hawaii's projected population growth, considering expected changes in household structure and demographic characteristics.

4.1 Population and Housing Growth

Historically, housing growth in Hawaii has outpaced population growth (Figure 18). Housing growth was especially strong from 1970 to 1980 as the neighbor islands experienced a development boom. Total housing in Hawaii and Maui County increased by 80 percent and 138 percent respectively from 1970 to 1980. For state as a whole, total housing units increased by 55 percent during this period.

Figure 18. Historical Trend of Housing and Population Growth in Hawaii



Source: U.S. Census Bureau, Housing Profiles from Decennial Census of each year

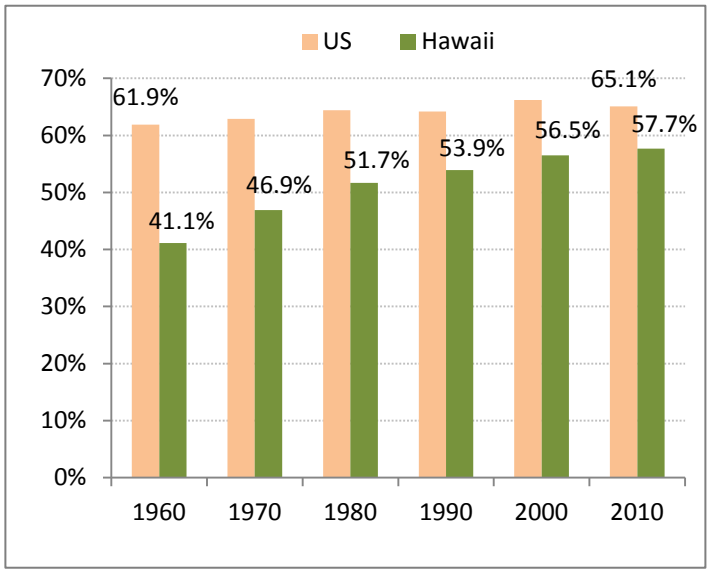
Although housing unit growth continued to outpace population growth for all periods shown in the table above, housing growth during the 2000-2010 period was only slightly higher than population growth. Especially, the housing growth in Honolulu County was sluggish during this period. The housing stock of Honolulu County increased at an average annual rate of 0.6 percent from 2000 to 2010 and this was lower than the population growth of 0.8 percent during the same period.

4.2 Home Ownership

Increasing the number of housing units in a given region does not necessarily increase homeownership in that region. The choice between owning and renting depends on a number of factors including housing availability, affordability for renters, tax policy, and other advantages and disadvantages of homeownership. For example, if new housing units are not affordable for renters looking to buy a home, the new units could be sold to wealthy residents who already own a house or out-of state residents who want to buy a house as an investment or vacation property. Furthermore, if future housing prices are expected to decline or if the tax structure is not favorable for home ownership, renters may choose to continue to rent even if new units are affordable.

The historical trend shows that homeownership in Hawaii has increased over time. This may be due to the housing stock growing faster than the population. Homeownership in Hawaii has increased from the 1960 figure of 41.1 percent (20 percentage points lower than the national average) to the 2010 figure of 57.7 percent. Although Hawaii's homeownership in 2010 was still 7.4 percentage points below the national average, the gap in homeownership between Hawaii and the U.S. has significantly decreased during the past 50 years.

Figure 19. Homeownership Trends, Hawaii vs. U.S.



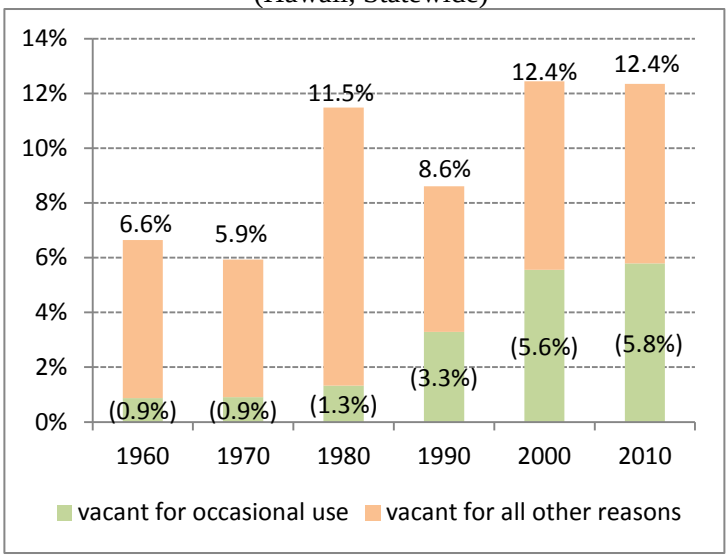
Source: U.S. Census Bureau, Housing Profiles from Decennial Census of each year

4.3 Vacancy Rates

Vacancy rates are a good indicator of a given region's shortage or surplus of housing supply. Among 519,508 housing units available in Hawaii at the time of the 2010 decennial census, 455,338 units (87.6%) were occupied either by owners or renters and 64,170 units (12.4%) were vacant. Hawaii's vacancy rate of 12.4 percent was slightly higher than the overall U.S. rate of 11.4 percent for the same year.

A housing unit can be vacant for various reasons including selling the unit, listing the unit for rent, or the unit is sold or rented and waiting for occupancy. Another big component is vacancy for occasional use (seasonal, recreational, etc.). Vacancy for occasional use accounted for 5.8 percent of total available housing units in Hawaii in 2010, which is much higher than the U.S. average of 3.5 percent.

Figure 20. Vacancy as Percentage of Total Housing Units (Hawaii, Statewide)



Source: U.S. Census Bureau, Housing Profiles from Decennial Census of each year

Vacancy rates in Hawaii increased considerably from 5.9 percent in 1970 to 11.5 percent in 1980. Vacancy rates dropped to 8.6 percent in 1990, but increased again to 12.4 percent in 2000 and remained at a similar level until 2010. The increase from 1970 to 1980 could be the result of the increased building activity during the 1970-1980 period. In contrast, the high vacancy rate observed since 2000 was mostly due to the increase in the vacancy rate for occasional use. In 2010, 45 percent of the state's total vacancies were vacant for occasional use.

According to the Hawaii Housing Planning Study done by SMS in 2011, 7.3 percent of single family homes and 27.1 percent of condos in Hawaii were owned by out-of-state residents in 2011, implying that many of these units were being used for vacation homes. [1]

[1] SMS, Hawaii Housing Planning Study, 2011, Prepared for the Hawaii Housing Finance and Development Corporation, November 2011 (Table 7, p12)

The vacancy patterns show quite a big difference between Honolulu County and the neighbor islands. For all neighbor islands, about 18-24 percent of total housing units were held vacant in 2010 and a large portion of these vacancies were for occasional use. In contrast, the overall vacancy rate for Honolulu County was relatively low at 7.7 percent in 2010. The vacancy rate for occasional use in Honolulu, as a percentage of total housing units, was also low at 2.6 percent for 2010.

Table 14. Vacancy as Percentage of Total Housing (by county, 2010)

	Total	Occasional use	All other reasons
Statewide	12.4%	5.8%	6.6%
Honolulu County	7.7%	2.6%	5.1%
Hawaii County	18.5%	8.7%	9.8%
Maui County	23.4%	14.1%	9.3%
Kauai County	22.0%	14.0%	8.0%

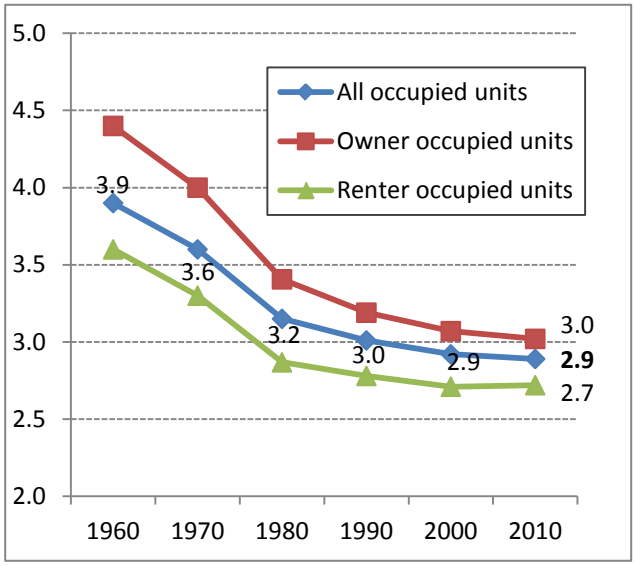
Source: U.S. Census Bureau, Housing Profiles from Decennial Census 2010

4.4 Household Size

Hawaii's average household size has decreased over time for both owner occupied and renter occupied units. This decrease occurred at a rapid pace between 1960 and 1980 as the traditional family structure changed. Although it has slowed since 1980, the downward trend continued until 2000. The average number of people per household decreased from 3.9 in 1960 to 2.9 in 2000.

One of the main causes of this trend was an increase in one person households. With increased individualism and improved financial ability to afford living alone, the share of one person households as a percentage of total households in Hawaii increased from 11.3 percent in 1960 to 21.9 percent in 2000. Hawaii's average household size has leveled off since 2000 at about 2.9 people per household despite the continued increase of one person households. The share of one person households increased from 21.9 percent in 2000 to 23.3 percent in 2010.

Figure 21. Average Household Size (Hawaii, statewide)



Source: U.S Census Bureau Housing Profiles Decennial Census of each year

One explanation for the leveling-off of the average household size, in spite of the increase in one person households, is the increase in multi-generational households. The increase in multi-generational households has been widely observed across the nation during the past decade. As with many other regions with high housing costs, many low income individuals in Hawaii are unable to afford to live separately from their families. The recent recession also contributed to the increase of multi-generational households as many individuals moved back home.

4.5 Number of Housing Units Required

Population growth is the most important component of long-term housing demand. Hawaii's population is projected to grow at about 0.85 percent annually until 2020, adding about 85,000 more people from 2013 to 2020. If the average household size remains unchanged at the current level of 2.9 people per household, Hawaii will need to add about 4,100 new housing units every year to adequately house the projected population growth until 2020. However, since not all newly built units will be occupied, Hawaii needs to build more than is required to accommodate the projected vacancy rates. Another factor to be considered in the estimation is the demolition of housing units. The number of units demolished has fluctuated over the years, but on average 520 housing units were demolished annually since 2000.[2] Thus, in order to add 4,200 new housing units annually after replacing demolition and subtracting units to be held vacant, approximately 5,200 units need to be built each year until 2020 to adequately accommodate the projected population growth. This estimation is based on the assumption that the average household size and vacancy rates will remain similar to the 2010 decennial census figures. However, if less people live in each household and if more housing units are held vacant for occasional use, Hawaii would need to build more housing units.

Another key issue to be taken into consideration is the impact of the aging population on the future housing demand. In Hawaii, the share of the population age 65 and older increased from 8.0 percent in 1980 to 14.5 percent in 2010. This trend will continue and the share of the population 65 and older will increase to 23.6 percent by 2040. [3] The majority of the people in this age bracket want to stay in their own homes as long as possible as they age. Since the share of one person households is much higher in the elderly population, the increase in this demographic is likely to decrease the average household size. However, this trend may be offset by trends in the other direction such as the increase in multi-generational households. The next section forecasts construction values and residential housing is expected to lead the construction industry over the next two years.

[2] DBEDT, 2012 State of Hawaii Data Book, Table 21.07
[3] DBEDT, Population and Economic Projections for the State of Hawaii to 2040, March 2012

5. CONSTRUCTION FORECAST: *2014 and 2015*

The 2014 and 2015 forecast for the construction industry is for firm growth in both the public and private sectors. The industry is gaining momentum from the Kakaako development, the rail project, and government construction projects all coming together around the same time.

Forecast Methodology

Nine regression models were used to forecast private building permits, the value of government contracts, construction jobs, and the contracting tax base. The regression method was ordinary least squares and all the models used real values in constant 2012 dollars. The variables used in the regression models and their respective definitions are listed in the table below.

Table 15. Definition of Variables used in Forecasting Models

Variable	Definition
RNEWVSF	Real value of residential new single-family permits
RNEWVMF	Real value of residential new multi-family permits
HOTEL	Real value of hotel permits
CIO	Real value of other commercial & industrial permits
RRAA	Real value of residential additions & alterations
RAAO	Real value of other additions & alterations
GOV	Real value of government contracts
CJOB	Construction total jobs
TAXBASE	Real value of construction tax base
TIME	Time
RPI	Real personal income
UNE	Unemployment rate of Hawaii
RGDP(-1)	Lagged one year Hawaii real GDP
POP	Hawaii residential population
RPMTV(-1)	Lagged one year Hawaii real permit value
RPMTV	Hawaii real permit value
AR1	First order autoregressive variable
AR2	Second order autoregressive variable
MA1	First order moving average variable
MA2	Second order moving average variable
TJOB	Hawaii total jobs

The nominal values in current dollars are estimated based on the real value and projected construction cost index. All the independent variables used in the models were significant with a P value of 5 percent or less. The nine models utilized for the forecast are listed in the table below with the dependent variable and the associated independent variables listed in each respective row.

Table 16. Specification of Regression Models

Regression Model	Dependent Variable	Independent Variables
Single-Family Permit Values	RNEWVSF	TIME, RPI, UNE, AR1, MA1
Multi-Family Permit Values	RNEWVMF	TIME, RPI, UNE, AR1
Hotel Permit Values	HOTEL	UNE, RGDP(-1), TIME, AR1, AR2, MA1, MA2
Commercial & Industrial Permit Values	CIO	UNE, RGDP(-1), TIME, AR1, AR2, MA1, MA2
Residential Additions & Alterations	RRAA	POP, UNE, AR1, MA1
Other Additions & Alterations	RAAO	UNE, RPOP(-1), AR1, MA1, MA2
Government Contracts	GOV	UNE, RPOP(-1), TIME, AR1, MA1
Construction Jobs	CJOB	RPMTV(-1), TJOB, UNE, AR1
Construction Tax Base	TAXBASE	RPMTV, RPI, TJOB, TIME, AR1 MA1

Private Building Permits

Building permits are a leading indicator that is used as a proxy for future construction activity. There is a lag between the time the permit is granted and the actual time the construction activity starts. As described above, the three categories of private building permits are residential, additions and alterations, and commercial and industrial. Each of these categories was forecast separately (Table 17).

Table 17. Construction Industry Forecast by Category

Indicator	2014 Growth	2015 Growth
Private building permits	13.6%	10.4%
Residential new building	23.3%	13.5%
Residential new single-family	26.3%	13.8%
Residential new multi-family	15.6%	12.6%
Commercial & industrial	8.3%	10.3%
Hotel	3.1%	5.1%
Other commercial & industrial	10.2%	12.2%
Additions & Alterations	7.1%	7.8%
Residential additions & alterations	6.8%	6.9%
Other additions & alterations	7.4%	8.8%
Value of government contracts	17.4%	3.1%
Construction jobs	5.4%	5.9%
Construction tax base	12.4%	8.3%

Residential construction is projected to have strong growth as supply chases demand. The forecast for residential permit values is for an increase of 23.3 percent in 2014 and an increase of 13.5 percent in 2015, with projected values at $1.29 billion and $1.46 billion respectively. New single family construction will lead the growth, with projected increases of 26.3 percent in 2014 and 13.8 percent in 2015. While not as strong as single-family, multi-family permit growth is projected to be 15.6 percent in 2014 and 12.6 percent in 2015. However, the total forecast values of 1.29 billion for 2014 and $1.46 billion for 2015 are still well below the 2005 peak of $2.26 billion.

The Commercial and Industrial category is expected to increase in the next two years as companies cautiously move forward with projects that were put on hold during the downturn. The growth in the commercial and industrial category is projected to be 8.3 percent in 2014 and 10.3 percent in 2015, with projected permit values of $316 million and $349 million respectively. While the forecast predicts two consecutive years of growth, the forecast values are still below the 2006 peak level of $732 million.

The category that is likely to have some volatility is additions and alterations. The solar tax credit revisions and grid constraints appear to have had an impact on the value of photovoltaic permits. Therefore, the forecasted growth in the additions and alterations category is below most of the other categories. The forecasted growth for 2014 is 7.1 percent and 7.8 percent in 2015. The forecast for permit values of the additions and alterations category is $1.42 billion in 2014 and rising slightly to $1.53 billion in 2015. The residential additions and alterations category includes photovoltaic permits and therefore is projected to grow slower than the non-residential other category, with forecasted growth of 6.8 percent in 2014 and 6.9 percent in 2015. The other additions and alterations category will grow at a faster pace with 2014 growth projected at 7.4 percent and 2015 growth at 8.8 percent.

The total private construction forecast was derived by summing the forecasts for the three private building permit categories: residential, commercial and industrial, and additions and alterations. The 2014 forecast for the private construction sector is $3.02 billion dollars, a 13.6 percent increase over 2013. The 2015 forecast is for $3.33 billion, a 10.4 percent increase over 2014. While the forecast predicts continued growth in the industry, the 2014 and 2015 forecast values are expected to remain below the 2006 peak of $3.8 billion.

Government Contracts Awards

The forecast was calculated using Hawaii's Building Industry Magazine's government contracts awarded data. It is important to note that these data are the value of contracts awarded rather than permit values as with the private construction sector. The value of the contracts awarded includes federal, state, and county projects. The forecast for government contracts awards is for 17.4 percent growth in 2014 and 3.1 percent growth in 2015. The respective forecast values are $1.41 billion and $1.45 billion.

Construction Jobs and Contracting Tax Base

Once permits are authorized, companies start to hire workers and begin the actual construction activity. The period in which the construction activity occurs can be seen in the construction jobs data. The 2014 forecast for construction jobs is 46,592 jobs, a 5.4 percent increase over 2013. The 2015 forecast is for 49,334 jobs, a 5.9 percent increase over 2014.

While jobs data are a good measure for current building activity, the contracting tax base is a proxy for completed construction. Since the low point of 2010, the contracting tax base has made strong gains. The 2014 forecast for the contracting tax base is $8.3 billion dollars, a 12.2 percent increase over 2013. The 2015 forecast is for $9.0 billion, an 8.3 percent increase over 2014.

6. Conclusions

Over the past decade, Hawaii's construction industry has gone through a full cycle of expansion and contraction. The previous construction cycles were led by residential construction. However, the current construction expansion phase that started in 2012 is led by activities in the addition and alterations category, one third of which were photovoltaic system installations. The value of new residential building permits fell to 31.7 percent of the total from 64.7 percent in 2005, while the permit values of additions and alterations increased its share from 22.9 percent in 2005 to 58.1 percent in 2012. The number of new residential units authorized during the 2001-2013 period averaged about 2,800 units each year and this is less than half of those authorized during the 2000s of about 6,000 units per year.

There are three factors that are driving up housing demand in Hawaii. First, is the population growth, which has been growing at a rate of 1.0 percent annually since 2010 and 1.2 percent annually between 2000 and 2010. This converts to an additional 14,000 people per year that need places to stay. Second, is the high rate of homes that have been converted to visitor use due to a limited amount of hotel rooms, especially on Oahu. As of 2012, there were more than 10,000 housing units were converted to visitor accommodations. Third, is the increase in military forces that have been shifted to Hawaii as a result of the national defense strategy to shift forces from the Atlantic to the Pacific. These active military personnel and their families are increasing demand for off-base housing.

Due to the previous contraction in the construction industry, especially in the residential area, there is currently a short supply of residential housing units. This shortage may drive up home price more in the next few years.

In 2013, private building permits increased 2.9 percent over 2012. Residential construction led the growth with an increase of 22.4 percent as supply continued to chase demand. The growth in residential construction is expected to continue as the population grows at a projected annual rate of 0.85 percent from 2013 to 2020. In order to accommodate this population growth, it is estimated that an additional 5,200 housing units will be required annually.

The commercial and industrial category also had strong growth in 2013 with an increase of 9.4 percent. The category that was a lag on growth was the additions and alterations category, which was down 8.9 percent over 2012. One reason for this decline was a 29.7 decrease in the value of photovoltaic permits. In looking at the counties, three of the four counties had an increase in 2013 permit values with Honolulu County up 5.5 percent, Hawaii County up 3.8 percent, and Kauai County is up 6.8 percent. The one county that showed a decrease was Maui County, which decreased 11.4 percent in 2013.

Currently, the construction industry contributes about 5.5 percent to Hawaii's gross domestic product, which is down from the peak of 6.8 percent in 2007.

The forecast for Hawaii's construction industry is for growth of 12.4 in 2014 and 8.3 percent in 2015. Construction job growth led Hawaii's economy adding 2,500 jobs in 2013 and the job growth will continue in 2014. There are a number of positive factors that will drive this growth including infrastructure projects, large scale commercial projects, and residential construction. The two most prominent of these are the Honolulu Rapid Transportation Rail and the Kakaako area development projects. Hawaii also appears to be well positioned to benefit from the military's "Pivot Towards Asia" policy of redeploying resources in the Pacific Region. One example is the National Defense Authorization Act, which includes approximately $400 million in military construction projects for the state.

While we expect the fundamentals of construction to continue to be positive, there are some areas of the economy that deserve caution including the Fed's monetary tapering policy, mortgage rates, and continued volatility with Hawaii's photovoltaic permits. However, the positive momentum of Hawaii's construction industry is robust and construction will be one of the main engines for growth in 2014 and 2015.

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