



HIGHLIGHTS

- Florida's economy is slowly emerging from the deep recession, but construction and real estate industries will remain shadows of their former selves
- On a 5-year projection, these industries will contribute roughly \$2.9bn less to the economy each year relative to their historical footprints
- There is a critical opportunity for industrial clusters within aerospace, medicine and information technology to fill the void with an expanded role in Florida's economy
- The extended presence of high-tech industries within the state will have a number of powerful knock-on effects through high-wage jobs and expanded manufacturing and financial sector output
- Combined, transportation and technical, scientific and professional services should see jobs grow by more than 22,000 positions annually. These new jobs would buoy other areas of the economy – like retail
- A greater high-tech presence would boost productivity. A one percentage point increase in productivity would equal an additional \$1,800 per Florida resident in five years time

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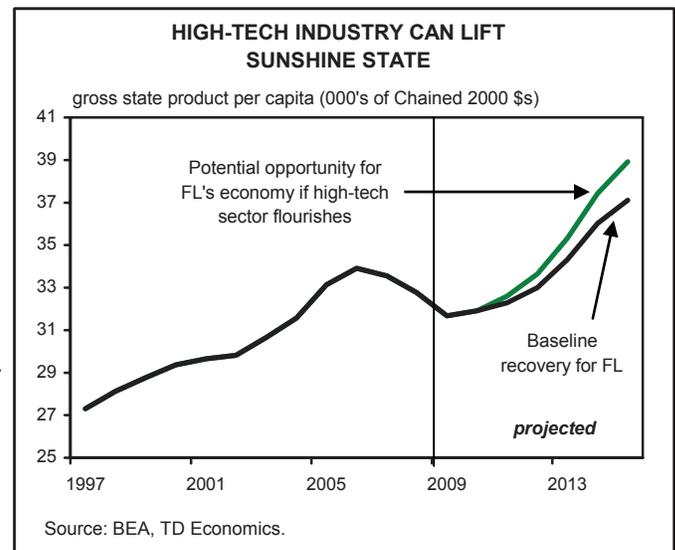
HIGH-TECH SECTOR OFFERS RAY OF SUNSHINE FOR FLORIDA

Introduction

Battered and bruised, Florida has finally emerged from the recession. A year into recovery, it has become clear that it will be a long time before home prices recover and the unemployment rate returns to a trend level near 5%. Furthermore, traditional sources of strength have left a void in the state's economy, as the once stalwart construction and real estate sectors are shadows of their former selves.

But, the future is not as bleak as it seems on the surface. Some of Florida's strengths, such as tourism and retail, are recovering alongside the national economy and a bright future is in store for the state's high-tech industries. Florida has been successful in developing clusters of activity in aerospace, medicine and information technology. These dynamic and high-growth industries are well positioned to take on a greater profile within the state's economy, filling part of the economic void left by the construction and real estate sectors.

If these high-tech industries flourish, they will have a powerful and lifting impact on Florida's entire economy. Alone, these sectors could account for a cumulative 13 percent of the state's economic growth over the next five years. Yet, as the adjacent graph demonstrates, even more powerful impacts will be felt as these innovative enterprises buoy the Sunshine State's sustainable pace of economic growth. In turn, all sectors – from retail to real estate – will profit as the wealth forged by high-value producers permeates through the economy. So while the aftermath of the recession will continue to afflict Florida, there is good reason to believe that the sustainability and strength of the high-tech sector can offer brighter days for the Sunshine State.



An Overzealous Construction Industry

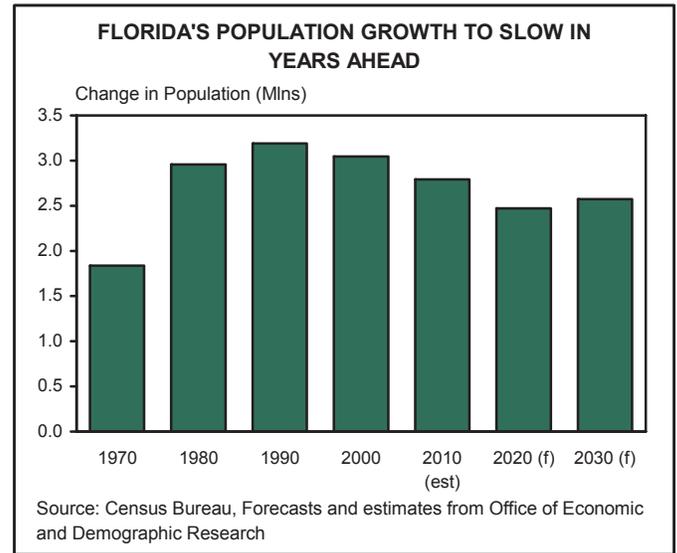
Before we can address the potential economic benefits from an expansion of high-tech industries, we cannot gloss over the fact that there are no quick fixes to Florida's economy, and realistically the construction and real estate sectors will always have an outsized presence due to Florida's favorable demograph-



ics. Between 1970 and 2008, the population surged from 6.8 million to 18.4 million, equivalent to adding a modern day Tampa Bay region to the state every decade. Such an increase in the population was, on a relative basis, much larger than the U.S. average. Naturally, more people leads to more new homes, more financing and more realtors. Even so, housing development in this past decade was excessive relative to population growth. As the chart below shows, the ratio of housing starts to population began rising at a much faster pace in Florida than the United States in the mid to late 90s. This diverging trend became even more exaggerated for Florida during the housing bubble years of 2002 to 2006 – a signal that fundamentals were not underpinning the state’s explosive construction activity.

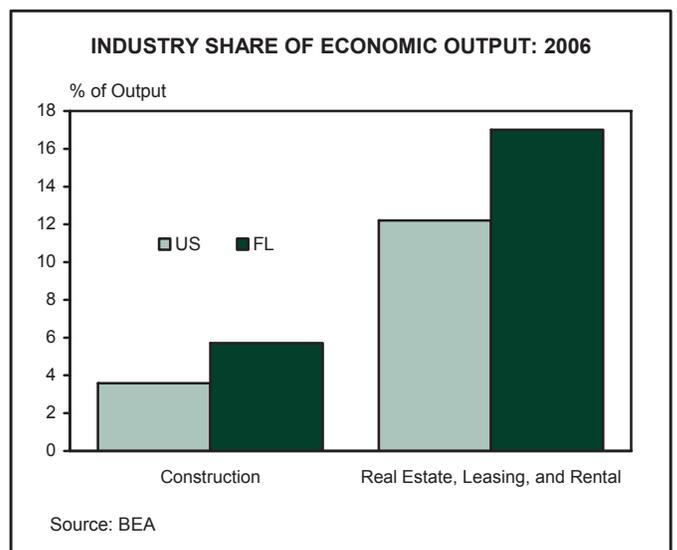
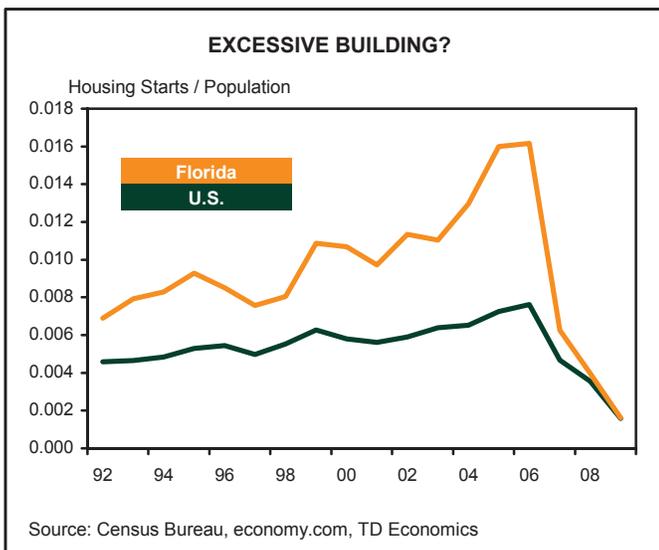
Exorbitant building and leasing activity meant that Florida’s construction and real estate sectors were destined to contract to a more sustainable level. By 2007, this process had begun in earnest. Between 2006 and 2008, real estate and construction output had fallen from 22.7% to 22.0% of Florida’s economy. Although this may seem like a minor adjustment, it is equivalent to a \$5.2 billion loss in output. While more recent state output data is not available, evidence suggests that building and leasing activity faced further significant declines as a share of the economy. In 2009, real estate and construction employment fell a combined 16% compared to just 3% across other Florida industries. As of September 2010, real estate service employment had fallen 2.5% during the year, while the rest of the private sector showed modest growth.

So it makes sense to believe that Florida’s construction and real estate industries will not return to their former glory, especially considering that the state will experience



a slower pace of population growth. Inward migration has played a leading role in Florida’s strong population growth since the 1970s, but this trend reversed in 2009 when the state experienced its first year of outmigration since WWII. While demographers forecast¹ that Florida migration between 2010 and 2020 will support population growth that exceeds the national average, the inflow of people will be slower than it was during the 1980s, 1990s and 2000s. In particular, a slow uptake of slack in the job market will dull the traditional magnet for attracting new people. Likewise, a slower rate of population growth will naturally lead to less demand for real estate and construction activity.

After taking into account the current downturn, and a modestly slower pace of population growth in the future, construction and real estate activity should eventually find a stable balance in Florida at roughly 19-20% of the



economy. While the industry will remain larger than the national average, it will not have the economic footprint of the 2000-to-2006 period. Nevertheless, the reduced size means the sectors will contribute roughly \$2.9 billion less to the economy each year relative to its traditional share. And that figure does not include the indirect effects to retail and other sectors.

So, the construction and real estate sectors will not be the engines for state growth they were in the past. Between 2000 and 2006, almost one-third of Florida's cumulative economic growth emanated from these industries. Over the next ten years, these sectors are more likely to account for about 20% of economic growth. This means that the state's economy will come to increasingly depend on other industries for growth in future years. And, it looks to us that Florida's often overlooked high-tech sector stands ready and able to answer this call.

High-tech Opportunities

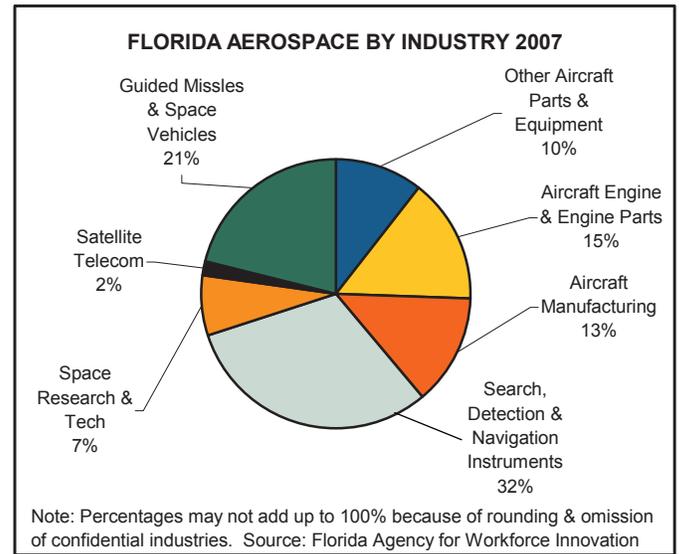
There are two ingredients already in the mix that give us reason to be positive about the future potential of Florida's high tech-industries. First, the state has established, and emerging, industrial clusters. These concentrations of expertise are powerful sources of cutting edge innovations that attract labor and they are also industries that drive economic growth. Second, Florida's trade linkages give these clusters an opportunity to expand across state borders and internationally.

Ingredient 1: Clustering

Innovative and high-tech sectors thrive off the network effects created by industrial clustering. There are many well known examples of this from the vibrant energy sector in Texas, to Silicon Valley's world famous computer industry. As more firms concentrate in a region, economies of scale are realized. This lowers costs and promotes competition and collaborations, which drive new ideas and opportunities. Florida has the good fortune of possessing several emerging and established industrial clusters in aerospace, medicine and information technology (IT).

Aviation & Aerospace

Perhaps the most well known cluster in Florida is the aerospace sector. Over the years, the presence of seven major air force bases, six major naval facilities and the NASA Shuttle Program at Kennedy Space Center laid an extensive foundation of knowledge and industrial capability. Many traditional sources of growth, such as aircraft maintenance and parts suppliers, remain firmly intact. And despite a scal-



ing down of military outlays as operations in Afghanistan and Iraq wind down, the continued demands of the navy and air force will ensure that demand for a variety of aerospace related products and services is sustained far into the future.

Of course, the industry faces a notable challenge as the NASA Shuttle Program is decommissioned. Thousands of lay-offs are planned across the Space Coast over the next few years and will result in falling incomes and lost skills. While programs are in place to keep as many of these skilled workers in the state as possible through retraining and, where possible, reallocation, Florida's space industry is entering a period of painful restructuring.

However, there are budding signs that innovation will create new opportunities, as the commercialization of Florida's unique space infrastructure presses on. Virgin Galactic is among several firms with plans to make recreational space flights from Florida's spaceports. And, while commercial satellite launch activity suffered a setback during the recession, Florida will continue to benefit from this integral part of modern communications technology.

Other initiatives in the aerospace sector highlight the flexibility of this cluster to adapt to changes and attract related spin-offs that utilize the state's existing industrial expertise. Florida airports – including: Miami, Daytona and Orlando – are among key testing grounds for the FAA's Next Generation Air Transportation System (NexGen) – a program that hopes to integrate satellite technology into air-traffic control systems. Also, Florida is taking a lead role in the development of increasingly popular unmanned aerial vehicles used in surveillance and military operations. As the national economic recovery progresses, Florida's established presence in aerospace will continue to position



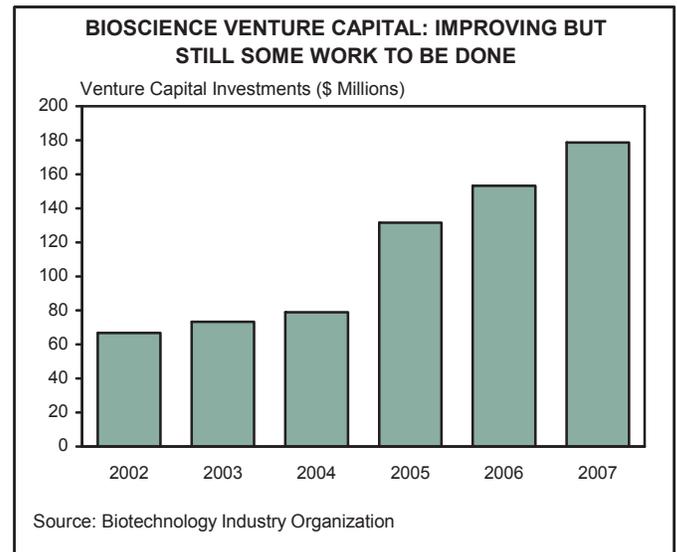
the state as a source of innovation and growth in this large national industry.

Medicine

Another promising cluster of activity is emerging within Florida's medical industry. The talent and skill drawn to serve the state's large retiree population has sparked the development of a leading health care services sector. Numerous top ranking hospitals – from the Moffitt Cancer Center in Tampa to the Mayo Clinic in Jacksonville, and the Miami Children's Hospital – preside in Florida and attract patients from across the United States and abroad.

The state's healthcare service industry has triggered growth across the broader life science sector. The Sunshine State now boasts one of the largest medical supply manufacturing bases in the country. Ongoing development of Florida's high-tech medical capabilities, including pharmaceutical production and bio-medical research, could position Florida to take a leading national role across the entire medical industry.

A keystone underpinning Florida's potential in the advanced life-science industry is the state's university system. A study done by the Milken Institute² found that the University of Florida was the fifth most successful university in America at transferring and commercializing biotechnologies between 2000 and 2004. Meanwhile, the Florida Atlantic University has made impressive strides in recent years with its Biomedical and Marine Biotech Center of Excellence and through its new partnership with Scripps Florida. These universities will be world-class engines of new ideas and innovation, if the state's industry maintains its recent momentum.

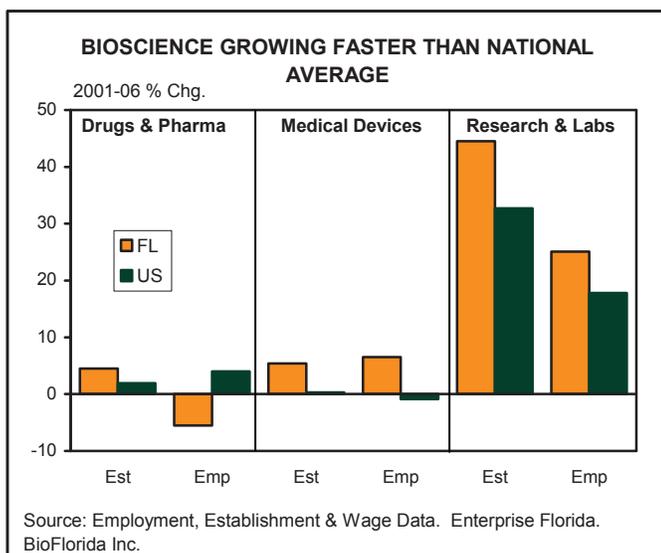


Demographics will be a powerful source of demand for the medical industry in the years ahead, as a large segment of America's population enters retirement. As a leading provider of medical services, Florida is well positioned to benefit greatly from these growing needs. However, the real opportunity for the state's economy is the ongoing development of its high-tech capabilities.

Continued support for state and private initiatives, ranging from Centers of Excellence to the formation of new university collaborations, should cement Florida's position as a vibrant world class medical cluster. Yet, to fully tap into the enormous potential of its developing medical industries, Florida will need to ensure that start-ups have sufficient access to capital by streamlining its venture capital markets. A two-pronged policy approach should help facilitate this advancement.

First, ongoing support must be given, and improvements must be made, to state initiatives focused on establishing the business culture, workforce and infrastructure critical to attracting venture capital funding. For instance, Workforce Florida Inc. has made the life science industry a priority and is engaging with regional economic development agencies to better align labor force skills with employer needs. This program is well conceived; but, Florida's workforce remains less educated than many leading venture capital states, like California and Massachusetts, and skill mismatches persist between laborers and employers. Continued efforts must be made to accelerate change and improve these outcomes.

Florida's government has also taken steps to enhance the state's venture capital infrastructure through the Florida Opportunity Fund and the Florida Institute for the Commercialization of Public Research. Since these programs were



only legislated in 2007, it is too early to gauge their success. But, progress should be closely monitored to ensure that the programs objectives are being met.

Second, Florida policy makers must facilitate the most competitive business environment possible. Venture capital funds will naturally be drawn towards the nation's hotbeds of entrepreneurial activity. Thus, policies should shape the most favorable environment for attracting new start-ups and ensuring their success. On this front, Florida's legislators should be commended for repealing a law in the summer of 2010 that added an unnecessary layer of regulation at the state level to medical device manufacturers. However, much more could be done. Implementing an R&D tax credit would immediately support start-up firms and possibly even attract some larger players into the state. Furthermore, the existing sales tax on manufacturers' inputs should be repealed, as it discourages capital investment which ultimately lowers Florida's productivity. While many firms are exempt from this tax, the policy complicates the tax code, adds additional layers of unnecessary regulation and leaves legislators favoring select firms and industries.

Ongoing and concerted efforts to bolster Florida's human capital and enhance the competitiveness of the state's companies will aid all high-tech firms in their efforts to attract the deep venture capital funds available in the United States.

Synergies and IT

Another sign of Florida's high-tech potential comes from the state's IT sector, where innovative synergies are being forged between the aerospace and medical industries. Take for instance the state's pioneering simulation technology that is employed by doctors and pilots alike to replicate life-like scenarios for training; or, the advanced use of light,

also known as photonics, used in advanced computer applications and communication equipment employed by the military and in hospitals.

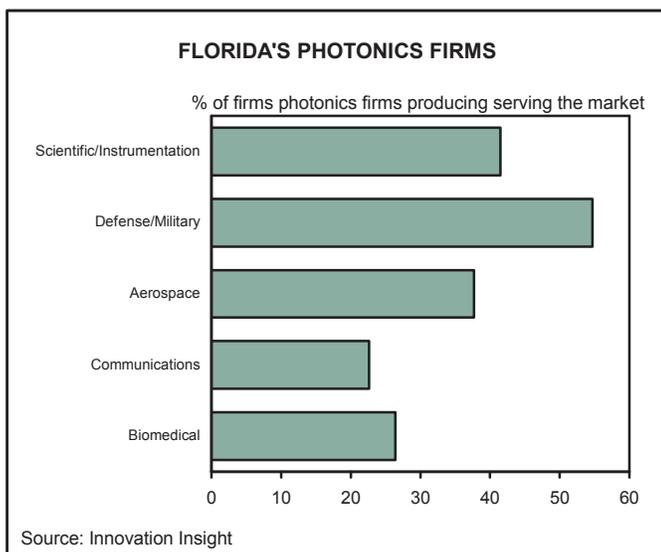
Beyond aerospace and medicine, Florida's IT industry is burgeoning in its own right, with new opportunities ranging from software development to sophisticated micro-processing equipment like semi-conductors and nanotechnology. Since the onset of the recovery, business investment into these products has been a real bright spot and production among many software and IT firms has already surpassed the peaks established before the recession started.

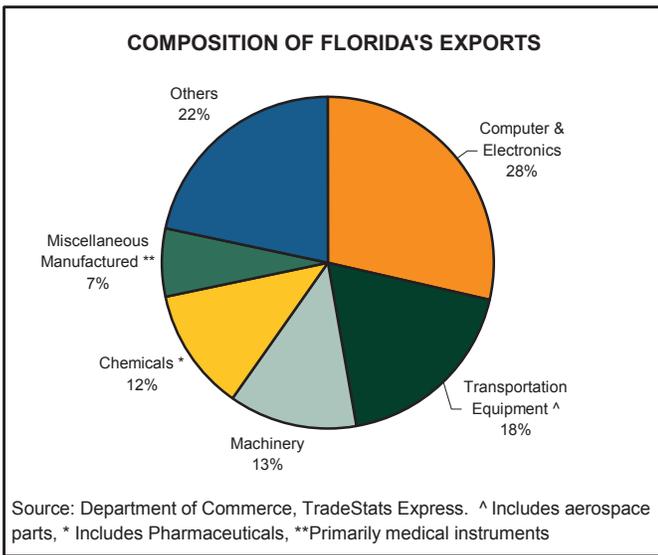
In sum, Florida's aerospace, medical and IT industries all exhibit enormous potential for innovation and future growth. Without question, these industries face challenges as the NASA Shuttle Program ends in 2011 and advanced segments of Florida's life sciences sector have yet to establish a critical mass. However, there are encouraging signs that these challenges are being confronted and overcome through innovation and some supportive state policies. In the past, these industries lived in the shadow of the state's large real estate sector; but, with the shrinking presence of real estate, these sectors have the raw potential to take on greater economic importance. In order to truly do so, however, advanced industries will need to tap into vibrant sources of demand beyond the state's borders. The U.S. economy's sheer size and propensity for innovation will naturally serve as an essential source of demand. However, in this era of globalization, many of the more dynamic opportunities for growth are emanating from outside U.S. borders. Florida's unique access to many of these marketplaces provides yet another reason to be optimistic over the potential of state's high-tech producers in the years ahead.

Ingredient 2: Trade Opportunities

Between 2000 and 2008, manufactured goods shipped abroad rose from 5.3% to 6.6% of state output. But there is still plenty more room for growth, as Florida's export exposure lags the national average by just over a percentage point – equivalent to \$7.4 billion in output if the share of exports were to converge with the national trend. Florida's unique coastal geography, and proximity to some of the world's leading emerging markets, should ensure that the Sunshine State at least catches up to the rest of the country during the next five to ten years.

Continuing to build state exports is essential to Florida's economic future. The global marketplace is five times larger than the entire U.S. economy and represents a critical source of demand for many of America's producers. Nowhere is

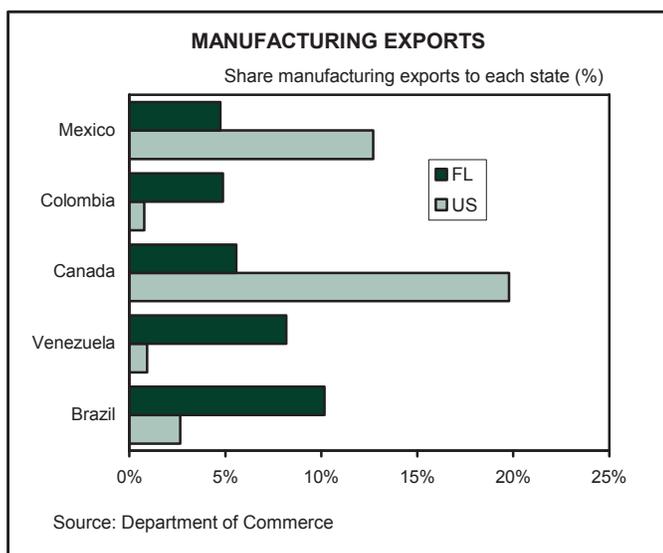




this fact more apparent than in the outsized contribution made by export growth during the current recovery cycle. Exports contributed five times more towards real GDP growth than has traditionally been the case, acting as a key catalyst to the recovery in industrial production. In Florida, export growth has managed to outperform the national trend during the past year and a half, and has mitigated what could have been an even more subdued recovery.

Many of Florida's exports emanate from the state's industrial clusters. For instance, computers and electronics made up 25% of Florida's manufactured exports in 2008 and include goods produced in the IT, aerospace and medical industries. Other important export groups include non-computer aerospace products and parts, and medical supplies.

Florida's recent export growth has come from ongoing



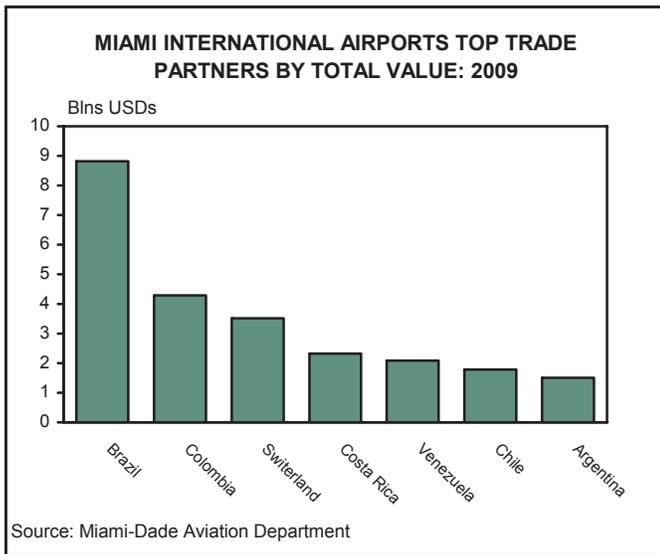
economic development in Latin America and in the Caribbean, home to nine out of Florida's top ten export destinations for manufactured goods. Latin America's largest economy, Brazil, has been a major source of growth, with exports to the region expanding by 53% between 2000 and 2008. But this strength has extended across much of the region, as exports to Venezuela, Columbia, and Chile have more than doubled during this period.

The global recession in 2008 and 2009 was a temporary interruption in export momentum to these foreign regions. Aside from Venezuela and Mexico, all the major Latin American economies have regained the losses experienced during the recession, and this has spurred a fast recovery for Florida exporters. After declining 17% in 2009, Florida's manufactured exports are on track to establish a new peak in 2011.

Beyond this cyclical bounce-back, favorable demographics and an ongoing trend towards macroeconomic reform will allow Central and South American economies to remain engines for Florida's export growth for many years to come. We project that Brazil's economy will experience growth almost double that of advanced economies over the next ten years, and a similar trend can be expected for most of Latin America's largest economies.

Brazil is particularly important for Florida's economic prospects because it is the largest export destination. With a population of nearly two hundred million people, Brazil is a developing economic juggernaut. The country is home to a growing middle class that exhibits similar spending patterns to households in the U.S., making Brazil a fertile destination for consumption exports. Medical supply exports have benefited tremendously from these spending habits, rising by nearly 60% between 2005 and 2009, and even managed to grow during the global recession. And, Florida's economic relationship with Brazil goes beyond a simple trade link. A prime example is Brazil's Embraer, the world's fourth largest aircraft manufacturer, who maintains its U.S. headquarters in Ft. Lauderdale, and serves as an important consumer of aerospace parts.

The strong trade and business ties with Latin America serves as a reminder of the importance of hitching a wagon to strong growth markets. As such, Florida should strive to expand and diversify its trade exposures with other parts of the world. It is a basic principle of business that no matter how promising a venture is, diversification always offers a necessary safeguard to protect against unforeseen developments. Moreover, for many medical and aerospace products, markets in Europe are as large, or larger, than in the United



States, representing enormous potential for export growth through increased market share. And, Florida should certainly not ignore the fact that global economic power has been steadily shifting towards Asia—as China, Korea and India continue to modernize and advance.

However, these trade opportunities won't just fall into Florida's lap. The ability to capitalize on existing export ties and expand exposure to other markets will require the maintenance and development of adequate trade infrastructure. In this regard, the Sunshine State has a number of advantages via diverse transportation assets that include railroads, highways, seaports and airports. For instance, Miami International Airport is the gateway for airfreight from the U.S. to Latin America, and upstages Dallas International as the South's prime cargo airport. Meanwhile Florida maintains 14 deepwater seaports to carry seaborne traffic. Integrating these and other modes into a seamless transportation network will be key to driving export growth.

The completion of the Panama Canal's expansion in 2014 presents some potential for future export growth. New shipping opportunities will emerge, as much larger cargo ships from Asia and Latin America's east coast are able to access Florida's seaports. However, the Panama Canal expansion appears to already have some shortcomings. Only limited expansion is underway and the state's seaports are already facing considerable capacity constraints. As such, Florida's exporters may not be able to utilize this expansion opportunity as effectively as one would hope.

In reality, infrastructure capacity constraints are almost inevitable because these projects are costly and time consuming to develop. This is why there is a lot riding on Florida's Department of Transportation's Strategic

Intermodal Strategy (SIS). The program must succeed in prioritizing the key transportation assets for upgrades and improvements. The most productive infrastructure projects must get priority funding in order for the broader economy to leverage its export advantage and industry clusters.

Florida's politicians and policy-makers could further alleviate these pressures by seeking creative new ways to increase funding. Some options being proposed are tolls and user fees to raise capital and match the private costs of using the state transportation assets with the public costs. Also, greater use of private sector funding and expertise through public-private partnerships could help overcome some of the funding constraints.

High potential for positive spin-offs

Florida's high-tech sectors have the potential to lift the state's entire economy. In direct terms, ongoing expansion of these industries will beget new economic growth and high-paying jobs in a number of areas from manufacturing to transportation. But more importantly, the wealth generated by high-tech enterprises will bring prosperity to virtually all industries in the state and elevate Florida's standard of living.

Technical, scientific and professional (TSP) services, manufacturing and transportation output will all expand in conjunction with Florida's high-tech clusters. TSP services supply crucial engineering, research, legal and tax expertise to Florida's high-tech enterprises. The manufacturing sector is also important, as it produces on a marketable scale the products developed by scientists and engineers. And finally, transportation services are the vehicles through which these highly specialized products are distributed throughout the

Florida's Port Expansion Plans			
Port	Current Depth	Planned Depth	Status
Jacksonville	40 ft	48 ft	Cost-benefit assetment to be completed by 2014
Ft. Lauderdale	42 ft	50 ft	Cost-benefit assetment to be completed by 2013
Miami	42 ft	50 ft	Cost-benefit completed. Approved by Congress. Still seeking funding

A depth of 50ft is required for the fully loaded post-Panamax ships that will be able to travel through the Panama Canal in 2014.
Source: Florida Times Union

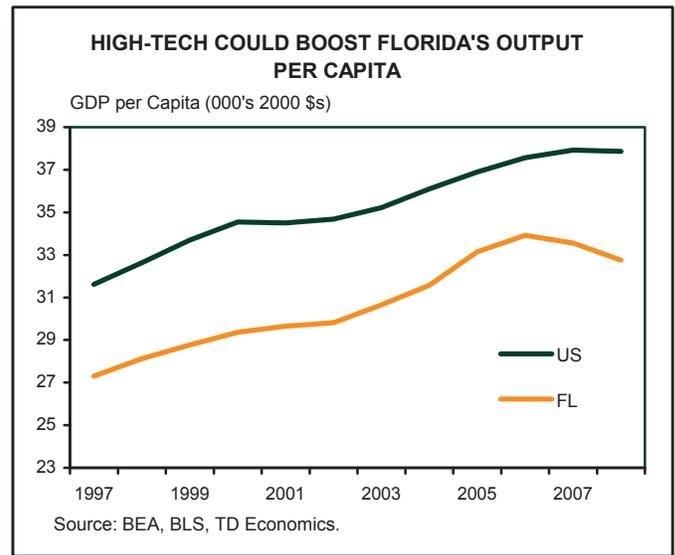
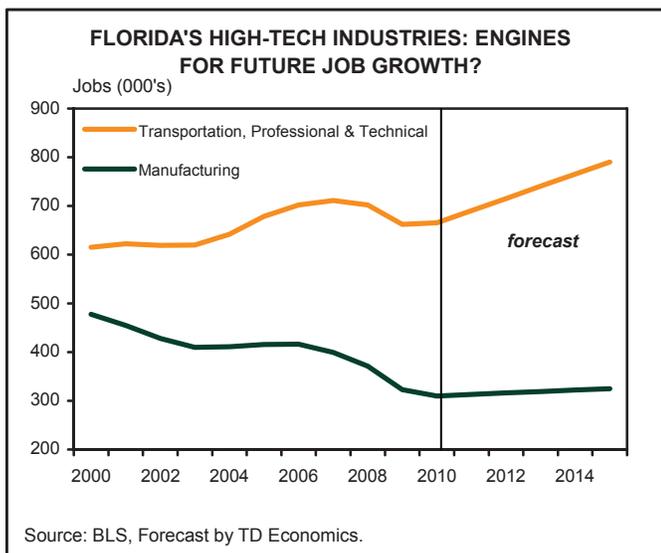
global marketplace

Combined, these three industries made up 16% of Florida's economy in 2008. Of course, not all of this output comes exclusively from the state's high-tech sectors, as many other industries manufacture goods, employ consulting services and export products. However, spearheaded by growth in Florida's high-tech firms, it is reasonable to suggest that these industries could expand to 19% of Florida's economy over the next five years. Under such a scenario, manufacturing, transportation and TSP services would account for 29% of economic growth and if high-tech activity lives up to its potential, it could well provide close to half of this growth.

Naturally, as these industries expand, they will create jobs. Ongoing research and development, and patent copywriting will stimulate employment in TSP services. Meanwhile, the transportation sector should also see some impressive job growth as airport, seaport, railroad and trucking activity all expand to facilitate new domestic and foreign trade. Combined, transportation and TSP services should see employment grow by more than 22,000 jobs annually across Florida for the next five years. This is a 22% increase relative to the decade before the recession.

Manufacturing employment will also reap rewards from Florida's high-tech producers, but the gains will be less impressive than among transportation and TSP services. Between 1991 and 2007, jobs declined in Florida's manufacturing sector by an average of 1.4% annually. We anticipate these declines will halt, and manufacturing payrolls could even improve by a modest three thousand (+0.9%) annual positions over the next five years.

This figure may seem low, but job creation in the U.S.



manufacturing sector is tempered by the industry's tremendous productivity gains. Between 2002 and 2006, manufacturing employment shrunk by 2.7% in Florida, while output expanded by a hefty 26%. So while Florida's manufacturers will continue to see healthy growth in the next five years, only a small portion of this will translate into jobs.

Many of the jobs created (or not lost in the case of manufacturing) in the TSP, transportation and manufacturing sectors will pay very well. Consider the average annual salaries of aviation and aerospace (\$75,383) or the microelectronic (\$82,716) industries³ that play a crucial role in the creation of cutting-edge medical products, compared to Florida's 2009 median income of \$41,171.

Yet beyond faster output growth for select industries and high wages for a segment of the population, Florida's high-tech enterprises can elevate the entire state's standard of living. Through the creation of highly valued products and services, the productivity of Florida's economy will rise, and increase the sustainable rate of growth. To illustrate this point, consider the following. Between 1997 and 2008, economic output grew a cumulative 46% in the Sunshine State, compared to 34% for the U.S. economy. However, this was the sole product of faster population growth. If instead we look at increases in state output per capita between 1997 and 2008, we see that Florida actually expanded at the same rate as the rest of the U.S. – 20%. Thus, while Florida's economic growth was impressive, living standards did not improve relative to the rest of the nation, and Florida's gross state product per capita still remains 13% shy of the U.S. average.

A growing high-tech industry would change this. The clusters and opportunities discussed in this piece are char-



acterized by their potential to improve Florida's output per capita, and in turn the state's standard of living. Since Florida's workers will be producing more output on average, the Sunshine State's potential growth – a measure economists like to use to gauge an economy's long-run average growth rate – will rise. To offer a sense of the impact this could have, if Florida's productivity growth increased by one percentage point, in five years, output per resident would be \$1,800 higher. As a result, business activity would be elevated across the state, from retailers profiting from greater spending to households taking in more forms of entertainment. Banks with weak balance sheets in the state will have new avenues to diversify away from real-estate lending. And, perhaps most importantly, the new wealth infused into the economy could sustain fundamentally sound improvements in the state's real estate sector.

Conclusion

Construction and real estate will always be a major element of Florida's economy, but in the years preceding the 2008-09 recession, these industries had simply grown too

large relative to economic fundamentals. Now the contraction of these sectors has left a void in the state's economy, and a period of structural adjustment will persist for many years to come.

Florida's often overlooked high-tech industries are well positioned to expand their profile within the state and ease some of this adjustment process. The established aerospace sector still maintains its traditional strengths, but is busy innovating and developing new sources of growth as the NASA shuttle program winds down. Meanwhile, with the proper policy proscriptions, the state's burgeoning medical industry could morph into one of the nation's leading life-science clusters.

Ultimately, the expanded presence of high-tech industries would be a powerful force for good within the state. It would support growth and job creation across a range of industries that pay high wages. Combined, these forces will help breath a little new life into Florida's deflated economy and trigger some much need optimism across the Sunshine State.

ENDNOTES

¹ Office of Economic and Demographic Research. Demographic Estimating Conference Florida Demographic Forecast.

² Milken Institute Technology Transfer and Commercialization Index 2000-2004, retrieved October 28th, 2010:
http://www.milkeninstitute.org/pdf/m2m2006_uni_tech.pdf

³ Florida High Tech. "Faces of Technology," retrieved October 29th, 2010:
<http://www.floridahightech.com/publication/magazine/fht2010/faces-of-technology.pdf>

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