

THE BLADE

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Ohio economy sputters as innovation declines



THE BLADE/ALLAN DETRICH

Patrolman Collin Fuelling's choice of bicycle symbolizes the problems that led Huffy Corp. to close its factory in Celina, Ohio, in 1998. The police officer replaced his Huffy with a Trek, a company that focused on patents instead of cheap labor.

Politicians miss mark with development policies

First in a series

By **JIM TANKERSLEY**
and **JOSHUA BOAK**
BLADE STAFF WRITERS

CELINA, Ohio — They don't build Huffys here anymore. These days you can buy one, made in China, for \$34.88 at the Wal-Mart Supercenter a field and a fence away from the old plant.

George Huffman's Ohio-born company popularized BMX racing, powered U.S. Olympic teams to gold, and once led the world in bicycle sales. Huffy Corp. also axed 1,000 factory jobs in Celina, a two-hour drive southwest of Toledo near the Indiana line, in 1998. It went bankrupt in 2004.

Public officials, union leaders, and news reporters insisted for years that Huffy embodied Ohio's turn-of-the-millennium economic slide. They blamed

Ohio's economy is suffering, but not for the reasons you've been told. Beginning today and continuing over the next two Sundays, *The Blade* will explore the state's core economic problems and how the men who would be governor plan to fix them.



TODAY: Ohio's biggest economic problem isn't factory layoffs, and politicians aren't fixing it.

SEPT. 24: As private investors look elsewhere, state efforts fall short.

OCT. 1: Wanted: 1,000 engineers. (And other tales of the real "brain drain.")

a manufacturing exodus by household names such as Rubbermaid, Hoover, and Mr. Coffee on the search for cheap foreign labor to satisfy discount stores such as Wal-Mart.

Ohio's slide is real. Its economy, which once paced the country, has trailed national averages in job creation and income growth for more than a decade. Politicians note frequently that

the state lost more than 200,000 manufacturing jobs during the last five years.

Both major candidates for governor this fall know economic struggle personally, and both say they know what ails the state today.

Republican Ken Blackwell grew up in a housing project in Cincinnati, one of the nation's 10 poorest cities. Democrat Ted

Strickland is the son of a steelworker in Scioto County, where residents are paid less on average than almost any county in America.

"Ohio has found itself in a difficult place because there was not the anticipation or planning for what was coming," Mr. Strickland says. "We have been too largely reliant upon industries that have been dramatically affected by outsourcing or other foreign competition."

Mr. Blackwell blames taxes and government regulation. "We're driving folks with high net worth out of our state," he says.

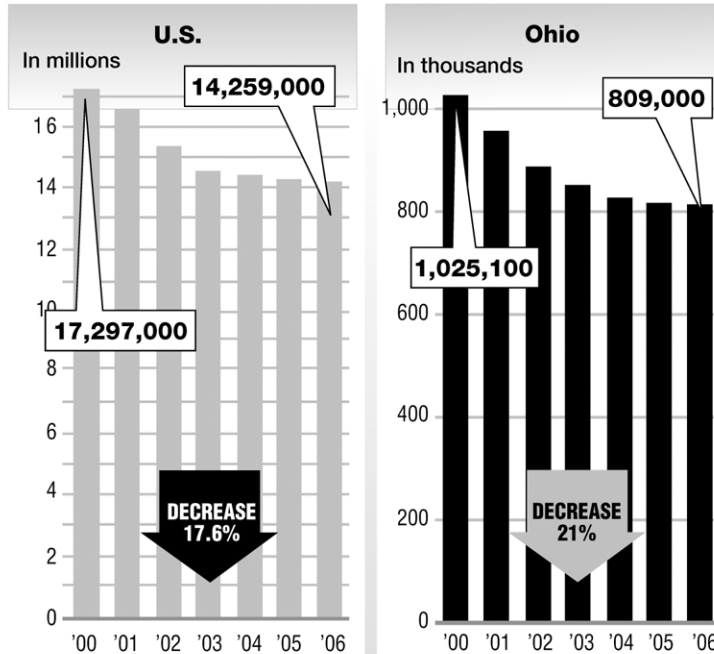
But Ohio voters should consider this in November: New research suggests neither Mr. Strickland nor Mr. Blackwell is fully addressing Ohio's real economic problems.

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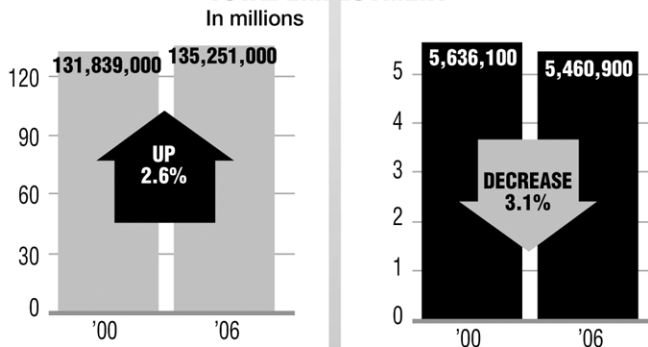
FACTORY DECLINE NOT JUST AN OHIO PROBLEM

Politicians and labor leaders blame a decline in manufacturing for Ohio's economic woes. Statistics suggest otherwise. The United States as a whole shed factory jobs at nearly the same rate as Ohio over the last seven years — but still added jobs overall while Ohio lost them. And even with 475,000 fewer workers, Ohio's factories produced twice as much in 2004 as they did 25 years before.

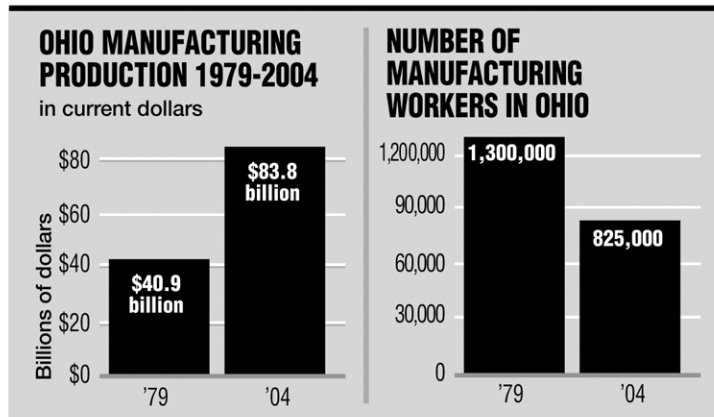
MANUFACTURING EMPLOYMENT



TOTAL EMPLOYMENT*



*Total non-farm employment



SOURCE: U.S. Bureau of Labor Statistics, U.S. Bureau of Economic Analysis

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Economy

Continued from Page 1

Factory layoffs, the research shows, did not cause the state's crash into mediocrity.

The story of Huffly is indeed the story of Ohio. It is not about vanishing jobs. It is about ideas and products that never appeared.

It's about the bike.

Pinpointing the problem

Even on wind-chilled winter mornings, Mark Schweitzer and Paul Bauer pedal 15 miles each from opposite ends of the Cleveland suburbs to their downtown offices at the Federal Reserve Bank.

The Fed has 12 branches and controls the nation's money supply by raising and lowering interest rates. The Cleveland branch boasts pink marble walls and a central machine-gun turret, a holdover from the days of John Dillinger.

Mr. Schweitzer and Mr. Bauer are economists in the bank's nonpartisan research division, which tourists rarely see. They hedge their words, since an unexpected comment by a Fed official at a congressional hearing or cocktail party can cause global markets to swing violently.

Bicycling is one of the few topics the men discuss freely. Mr. Schweitzer once joined 8,000 other amateur cyclists on a former Tour de France stage. Mr. Bauer finished a 250-mile trip from Cincinnati to Cleveland in two days. Mr. Bauer's favorite bike is his Trek Fuel 90, which Mr. Schweitzer covets.

When the economic boom that carried Ohio through the 1990s sputtered, Mr. Bauer and Mr. Schweitzer noticed the ensuing recession hit Ohio harder than the rest of the country. When the nation recovered, Ohio fell further behind other states.

Manufacturing job loss doesn't explain why. Ohio and its neighbors hold a disproportionate share of the country's manufacturing, yet America shed factory jobs at roughly the same percentage as the Great Lakes states.

The United States lost nearly 18 percent of its manufacturing jobs, more than 3 million solid paychecks, between 2000 and 2006, according to the Bureau of Labor Statistics. It still managed a net gain of 3.4 million jobs during that period, meaning that the country actually generated 6.4 million new jobs.

This is what economists call "creative destruction" — nimbler companies replace older ones, unleashing growth. Since 2000, Ohio witnessed more destruction than creativity. Its businesses eliminated 216,100 manufacturing jobs, 21 percent of its base. But they hatched a mere 40,000 jobs for a net loss of 176,100.

Mr. Schweitzer and Mr. Bauer wanted to know what was really wrong in Ohio. So they built what they call the most comprehensive analysis they've ever seen of why some states' economies outperform others.

Going back 75 years, Mr. Schweitzer and Mr. Bauer crossed average state incomes with key statistics in several areas, including tax rates, government spending, education levels, and climate. The long timeline ensured a random blip in the business cycle wouldn't skew the analysis.

The effort took nearly three years. An intern typed records scrawled on onion paper into databases. Mr. Bauer often sent new figures to Mr. Schweitzer past 10 p.m., knowing his colleague would respond before morning.

Their analysis, the main feature in the Cleveland Fed's 2006 annual report, challenges much of the campaign rhetoric of Ohio's gubernatorial candidates.

Tax levels and highway spending, two planks of Mr. Blackwell's economic platform, did not affect state income growth significantly. A state's concentration of industry, such as Ohio's reliance on manufacturing that Mr. Strickland decries, mattered only a little.

What mattered most, Mr. Bauer and Mr. Schweitzer discovered, were states' patents per-capita. A wealth of patents drove Ohio's economy in the 20th century. But in the past two decades, other states sprinted past.

The Birthplace of Aviation, the cradle of the cash register and Play-Doh, Ohio ranked sixth in the nation in per-capita patent generation in 1954. It fell to 11th in 1988. By 2001, Ohio slipped to 20th, passed by such nontraditional tech hubs as Wisconsin, Utah, and Idaho.

The Harvard University school of business found that Toledo churned out 4.81 patents per 10,000 employees in 2003, compared to a 7.81 average nationwide.

Ohio also struggles in what Mr. Bauer and Mr. Schweitzer identified as the second-strongest predictor of income: the percent of high school and college graduates in a state.

When 100 people walk down a street in Ohio, 23 have college degrees. In Toledo, it's 17. The concentration is higher in 37 other states, including Minnesota, where 30 percent of the population have at least a bachelor's degree. The average family income in Minnesota is \$63,998 — \$10,000 more than in Ohio.

Emerging research supports the Fed's methods and analysis. "Per-capita income growth is the best proxy for the local policy maker's true goal, which is to improve the economic welfare of current constituents," Rutgers University professor Paul Gottlieb wrote in a 2002 study of urban economic development.

The nonprofit W.E. Upjohn Institute for Employment Research concluded this year that a "skilled work force," a combination of education levels and patent generation, was the biggest factor in regional economic growth. Cleveland State University professor Ned Hill found in 2001 that patent-fueled productivity is more important than raw job numbers.

The experts all point to a glaring problem Ohio's leaders should have seen decades ago: The state needs more and better ideas.

"I don't think Ohio should need a wake-up call," Mr. Schweitzer said.

"It's somewhat disturbing," Mr. Bauer added.

The business of ideas

Patents are a government-licensed monopoly on an idea. They improve existing products and spawn new ones that attract investors, profits, and ultimately jobs.

That's what happened in Waterloo, Wis., home of Trek Bicycles.

With annual revenues approaching \$500 million and 1,700 stateside employees, Trek is now America's largest bike company. Its research and development division sits beside its assembly lines.

In 2002, Trek patented a method of weaving weapons-grade carbon fibers into a lightweight tube and changed the culture of a 120-year-old sport.

Molded together, the tubes form a bike frame weighing less than two pounds. Lance Armstrong climbed treacherous Alpine grades on Trek frames to win the Tour de France a record seven times.

"It's about doing it more comfortably, faster than ever before," said Eric Bjorling, Trek's marketing coordinator.

Huffy Corp. took a different route, which led to Ohio layoffs and bankruptcy. It focused on price rather than performance.

Beginning in 1998, Huffy shipped bike production from Celina to a nonunion factory in Missouri, then to Mexico, then to China, where it reportedly paid workers 4 percent of what it paid Ohioans. Profits didn't follow the jobs.

That strategy still riles John Mariotti, who stepped down as Huffy's president in 1992. He favored patenting the styling and "ornamental design" of bike frames, giving the company a legally protected edge against imitators in the children's market.

"Twenty years ago, we made bikes in pink and argyle," Mr. Mariotti said. "Eight-year-old girls loved them."

Huffy declined comment for this story. Before filing for bankruptcy, the company told investors the expiration of its patents would not hurt its \$430 million in annual revenues. The only valuable trademark, patent, or license listed in its 2003 annual

report is its company name.

Other once-pioneering Ohio companies watched competitors beat them to key advancements.

NCR Corp., of Dayton, patented carbon paper and electric cash registers but surrendered in the personal computing revolution. It has laid off 270 Ohio workers since 2000.

Mr. Coffee pioneered the drip coffee-maker market in the 1970s. But sales trickled during the late 1990s, when Starbucks made the store-bought espresso a daily ritual. Mr. Coffee eliminated 470 Ohio manufacturing jobs in the last decade.

Some of the nation's dominant industries sprouted far from Ohio. Idaho is enjoying a record streak of low unemployment, thanks to a computer industry that blossomed around Micron Technology Inc.'s memory chips. The company and a partner broke ground last month on a \$150 million semiconductor plant in Boise that will add 125 jobs.

Ohio public officials tried for years to lure expanding companies. Lucas County's Regional Growth Partnership recently hired consultants from IBM, America's single-largest patent producer, to study the Toledo area and recommend which firms it should target.

The head of IBM's domestic location strategies group, Gene DePrez, says top businesses want a pool of skilled workers, like-minded companies nearby, solid infrastructure, and a high quality of life. But nothing matters more than political and business leadership.

"If leadership is not on top of [innovation]," Mr. DePrez said, "is not pursuing it actively, not understanding what trends are going on, where investment is

being made, where innovation is taking place and how they can capitalize and support innovation, then ... you're doomed to failure."

Words vs. action

Talking about innovation was never a problem for Ohio politicians. Encouraging it was.

Gov. Richard Celeste created a technology-boosting grant fund in 1983. His economic development department bragged of

underwriting a better raspberry plant and a quick test for herpes. It dubbed the efforts "unqualified successes" and said Ohio's know-how was "advancing America's tomorrows," even as the state slipped in patent production.

Gov. George Voinovich pledged to "put a little sizzle" in economic development. When Mr. Voinovich prepared to leave office in 1998 for the U.S. Senate, his science adviser warned that the state invested too little in technology.

Gov. Bob Taft launched a "Third Frontier" plan to spend \$1.1 billion on new technology jobs and research. Even if it exceeds analysts' projections over the next 10 years, the program will replace less than half of the manufacturing jobs Ohio lost in the last recession.

"It's a long-term process," Mr. Taft said in a recent interview. "You're talking about transitioning an economy."

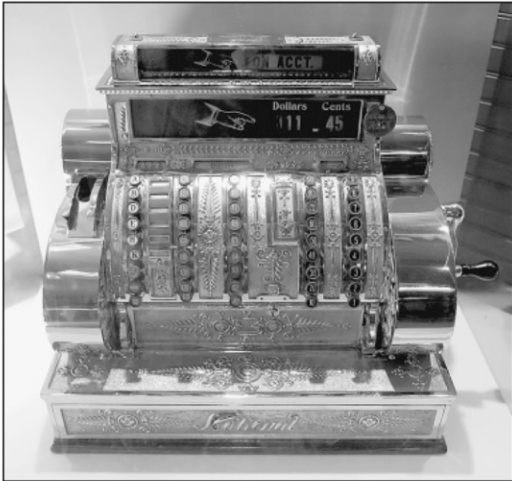
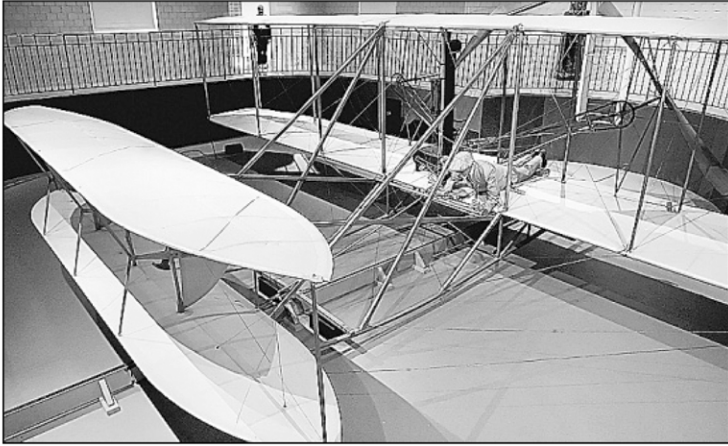
The main candidates to replace Mr. Taft talk a lot about economic transition. Mr. Strickland, a Democratic congressman and the front-runner in the race, often echoes his political predecessors.

In interviews, Mr. Strickland says it is "essential to support entrepreneurship." His "Turn-around Ohio" plan makes education and worker training the engine for economic growth. (In 1990, Mr. Voinovich pledged to make education "our No. 1 economic development tool".)

The Strickland plan continues Mr. Taft's Third Frontier initiative. It proposes \$250 million for alternative energy research. (Governors starting with Mr. Celeste invested hundreds of millions of dollars in alternative energy and focused heavily on "clean coal," a favorite project of Mr. Strickland and his GOP opponent.)

Mr. Strickland admits "the rhetoric may sound the same" as previous candidates. "The difference is," he says, "I'm serious about this."

Mr. Strickland claims existing state revenues would pay for his plan, but he said in a recent interview that transforming the economy will "take resources that I think currently are not there." See **ECONOMY**, Page 8



The 1903 Wright Flyer solidified Ohio's reputation as the Birthplace of Aviation, while Dayton-based NCR made the state the cradle of the cash register. Ohio ranked sixth nationally in per-capita patent generation in 1954 but fell to 20th by 2001.



A Wal-Mart Supercenter stands next to the former Huffey Corp. factory in Celina. Some observers blamed Huffey's departure on its quest for cheap foreign labor to satisfy discount retailers.

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Mr. Blackwell, the Republican secretary of state, says Ohio can rebound by becoming friendlier to business.

Ohio's "confiscatory tax code" and "costly regulatory environment" push the wealthy individuals who could finance those companies to leave the state, he contends. To entice investors, Mr. Blackwell would cut taxes and ease regulations. He rejects the Cleveland Fed's conclusion that tax rates don't affect income growth.

"I've spent a total of about 30 years working with the best economic minds, looking at tax reform and trends in the national and global capital markets," he says. "I've worked with the Federal Reserve bank, not just the regional bank, over the years... I don't need a think tank to answer these questions for me."

The wealthiest, most patent-producing states in the nation include low-tax New Hampshire and high-tax Massachusetts. Asked what states he looks to as a model of low-regulation economic growth, Mr. Blackwell cites Indiana. Its average income is slightly less than Ohio's. The Fed study ranks it 26th in patent generation.

Mr. Blackwell also proposes leasing the Ohio Turnpike to private investors for an estimated \$6 billion. He would split most of the money between road construction, which the Fed found did not influence economic growth, and business assistance administered by the Ohio Department of Development.

Both Mr. Blackwell and Mr. Strickland acknowledge the development department has not stopped the state's free-fall in ideas. But neither candidate has proposed substantial changes to how the department targets hundreds of millions of dollars in economic incentives annually.

The search for solutions

Mr. Schweitzer and Mr. Bauer's research does not conclude,



THE BLADE/ALLAN DETRICH

Pam Buschur, who heads the Celina-Mercer County Chamber of Commerce, says the town has rebounded since Huff's exit.

exactly, what policies would put Ohio back on the right track. They're still working on that. But they suggest a few broad principles: Identify the state's economic problems accurately, prioritize higher education, and emulate programs from more successful states.

Politicians might also learn from Celina, which found a way to survive after Huff's closure and left one-fifth of the town unemployed. Some plant workers ended up at Wal-Mart, which pays less. But others landed with new manufacturers, or they studied nursing at the local college, or they opened their own businesses.

The unemployment rate in Mercer County is 3.9 percent, the second lowest of Ohio's 88 counties and 2 percentage points below the state's average. The county's average annual wage grew by 23 percent since 1998 to more than \$29,000. That still falls below the state average of \$37,000, as it did eight years ago.

For 20 years, Huff employed Pam Buschur's husband, while she ran a pair of travel agencies. After the layoffs, Neil Buschur joined Fleetwood, a tractor-trailer company in nearby Decatur, Ind.

"It's kind of funny because my husband and I run into people he worked with and 95 percent have jobs that are better than when they were with Huff," said



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Mrs. Buschur, now the executive director of the Celina-Mercer County Chamber of Commerce. "Everyone's just kind of bounced back and moved on."

Down Main Street from the Chamber of Commerce, the Celina police maintain a bicycle patrol. One of the officers recently grew unhappy with his standard-issue ride, a customized Huff.

He replaced it with a Trek.

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TOLEDO, OHIO SUNDAY, SEPTEMBER 24, 2006

Investors turn away from Ohio

Heavy use of tax dollars to woo jobs doesn't pay off

Second in a series

By **JIM TANKERSLEY**
and **JOSHUA BOAK**
BLADE STAFF WRITERS

As he shaves each morning, David Morgenthaler ponders the one investment he can't spin into gold. It matters more to him than Apple computers and Nextel phones. It is the state he calls home.

Mr. Morgenthaler, perhaps America's oldest living venture capitalist, can turn his head past the medicine cabinet mirror and spy Lake Erie, where about 20 percent of the world's fresh water flows toward Niagara Falls. A short drive from his suburban Cleveland house, workers bend metal into sculptures of global commerce. Cars. Boilers. Bearings.

"I ought to be able to figure out how to put this together and make money out of it," the 87-year-old says. "I haven't been able to do it. I'm not innovative enough."

Cleveland-based Morgenthaler Partners funded Apple, Nextel, and 250 other startups. Of the 71 firms listed in its \$2.5 billion portfolio, only two are headquartered in Mr. Morgenthaler's backyard. Most Ohio companies don't meet his standards.

Ohio's economy is suffering, but not for the reasons you've been told. In a three-part

series that continues today and concludes Oct. 1, The Blade explores the state's core economic problems and

how the men who would be governor plan to fix them.

SEPT. 17: Ohio's biggest economic problem isn't factory layoffs, and politicians aren't fixing it.

TODAY: As private investors look elsewhere, state efforts fall short.

OCT. 1: Wanted: 1,000 engineers. (And other tales of the real "brain drain.")



Things were different once. Mr. Morgenthaler settled along the Great Lakes after fighting in World War II, passing on a strip of California bungalows and lemon groves now called Silicon Valley. Ohio, Michigan, and Pennsylvania, he says, had the

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THE BLADE/ALLAN DETRICH

Venture capitalist David Morgenthaler looks out the 27th-story window over the skyline of Cleveland. His firm has funded hundreds of startups, including Apple and Nextel.

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exciting jobs.

Private investors follow opportunity and help economies grow. Their risks show confidence in a state's future. And despite intense tugging by Ohio's government, the state's young companies receive 80 percent less venture capital funding than businesses nationwide.

Today, Ohio still battles a recession the U.S. government says ended in 2001. Only one group of investors bet heavily on the state's economy in the last decade: Ohio taxpayers.

Their returns are less than advertised.

The Ohio Department of Development spent billions of taxpayer dollars chasing its goal of "economic opportunities to improve the profits and prosperity of Ohio's citizens." The Republican and Democratic candidates for governor this fall want to spend even more.

By the government's own accounting, state economic development assistance is responsible for more than 520,000 jobs in Ohio since 1992.

But there's a difference between jobs and prosperity.

The lure of tax breaks

The drug testing labs of Phoenix International Life Sciences promised just the sort of high-technology jobs Ohio was courting in 1994. Its Canadian owners helped pharmaceutical companies run clinical trials.

When Phoenix International considered opening a new lab in Cincinnati, the Ohio Department of Development wooed it with a \$1.4 million incentive package.

This is how the department invests taxpayer dollars. To spur private development, it gives companies loans, grants, and tax credits for worker training, road and sewer upgrades, and general financial help. Its biggest package on record, totaling \$26 million, went to Toledo's new Jeep plant.

The state measures its return in jobs.

Phoenix International delivered 102. The thousands of other recipients of more than \$1 billion in direct state assistance from 1992 to 2001 created 183,906 new jobs and "retained" 337,611 others, including 4,744 at the Toledo Jeep plant, state records show. Retained jobs allegedly would have vanished or left without state intervention.

Gov. Bob Taft says Ohio leaders are "not in the business of Soviet-style development," meaning the government doesn't direct the state economy. Judge for yourself: The development department claims a return of 521,517 jobs from its programs, which equals 93 percent of Ohio's net job gain for the same period, according to the U.S. Bureau of Labor Statistics.

That doesn't make Mr. Taft a closet communist. Ohio's economic development measurement is flawed.

Consider what the state missed about Phoenix International. A rival bought it in 2000, closed its Cincinnati lab, and fired all of its Ohio employees. The layoffs came three years after the development department closed its books on the company and dubbed it a success.

"The legislature wants to know cost per job," said Walt Plosila, whom the state hired in 2003 to help plan its technology-based economic strategies. "That's not a good barometer of anything. You want to know the products, the growth prospects, the condition of the market."

Research, patents poor

Mr. Plosila was Pennsylvania's deputy secretary of commerce during the 1980s. He later helped nurture Maryland's biosciences industry before joining the Battelle Memorial Institute, an Ohio-based technology think tank.

His time in government taught Mr. Plosila that politicians preferred factory ribbon-cuttings to fostering entrepreneurship, a pattern he found historically in Ohio's development department.

Mr. Plosila's team told Ohio leaders to measure their efforts through income growth, university research expenditures, and patents per capita, among others.

Those standards paint a decidedly bleaker picture of Ohio's economy than the development department's job figures.

As recently as 1999, the average Ohio family's income matched the rest of the country, according to the Census Bureau. By 2005, that Ohio family made \$54,086, or \$1,746 less than the national average.

The state's universities spend \$115 per year on research for each person living in the state, which is 20 percent below the national average.

Between 1994 and 2004, Ohio ranked 40th in patent growth, right next to Arkansas.

Patents per capita are the most important predictor of state wealth, the Federal Reserve Bank of Cleveland recently concluded in a study that looked back 75 years.

A 273-page report by Mr. Plosila's Battelle team found the Ohio development department failed to encourage the companies most likely to generate valuable patents. The state, it said, is "composed of older, more established firms" that are not designing, developing, and making new products.

Those are companies in which the state's development department has invested most of its technology grants.

The two leading candidates for governor, Republican Ken Blackwell and Democrat Ted Strickland, both say the state must improve its economic development efforts — largely by doing more of the same.

Mr. Blackwell, the secretary of state, wants to lease the Ohio Turnpike to private investors, in hopes of pumping billions of new dollars into stimulus programs.

He also wants to cut taxes, ease regulations, and cap lawsuit awards, areas he calls "the walls we are building to capital investment" in Ohio.

The Fed found taxes have no effect on state incomes. About 47 percent of venture capital deals brokered this year went to companies based in California, a state singled out for high taxes and "low economic freedom" by the Pacific Research Institute, a conservative think tank regularly cited by Mr. Blackwell's campaign.

Mr. Morgenthaler says a company's profit stream is more important to him and other venture capitalists than a state's tax code. His clients — pension funds and college endowments — want a portfolio that will outperform the stock market by more than 5 percentage points.

Mr. Strickland, a congressman from Lisbon, says Ohio's development department will perform better if it spreads its spending more broadly around the state.

Asked how they will measure the results of their efforts, Mr. Strickland and Mr. Blackwell say job growth. Mr. Strickland goes on to say he will measure every state agency, not just the development department, on jobs — specifically, "living-wage jobs."

In Toledo, City Council defines a "living wage" job as about \$10.50 an hour with benefits or \$12.50 an hour without them.

Mr. Strickland is fond of citing the nonprofit Youngstown Business Incubator as an example of state development success. The incubator, he says, has spawned 160 jobs, at an average salary of more than \$60,000. It has licensed 16 patents.

The congressman got those numbers from incubator staff members. The state development department doesn't compile them, even though it gave \$2 million to the incubator in the last eight years.

Because it doesn't keep track, the department can't say how many patents, or what types of salaries, or even how many jobs, resulted from its \$634 million technology-targeted investments around the state. The state can't even list all the companies those investments funded, just like it can't list what it gets for billions of dollars it forgoes in corporate tax breaks.

The department's director, Lt. Gov. Bruce Johnson, says he evaluates state-assisted companies by additional criteria the state doesn't disclose publicly, including payrolls and access to outside investments, giving preference to "innovative" companies.

He says some department spending on infrastructure isn't easily tied to any measure, but he'd like to see more yardsticks for the rest.

Still, Mr. Johnson says, "The public policy behind having a development department is to help sustain a state's economy. Most people measure that ... with jobs."

Only one arm of the department requires detailed public measurements of its investments.

But even those results are open to interpretation.

Ohio's Third Frontier

In his January "State of the State" address, the term-limited Mr. Taft celebrated his signature achievement: the Third Frontier project, which seeds companies in the "imagine phase" and tracks their progress in income, patents, and research spending.

The 10-year, \$1.6 billion program will make Ohio "the best place to innovate and create new high-paying jobs," Mr. Taft told the legislators and statewide officials who filled the House of Representatives in Columbus.

"We're attracting more federal research dollars than ever before, leading to more good jobs for our college graduates," he continued. "We've seen increases over the last four years in patent applications filed, patents issued, and license income received from new products and inventions."

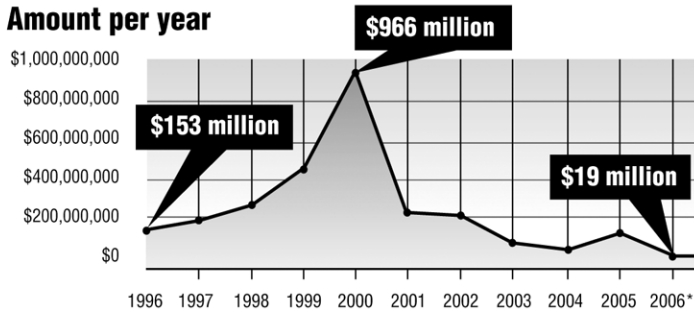
The governor's speech ignored uncomfortable truths about Ohio's economy.

Ohio actually got more research money in the past. In 2003, federal agencies gave the state \$2.39 billion for research (2.6 percent of the federal government's total research expenditures), less than half of the

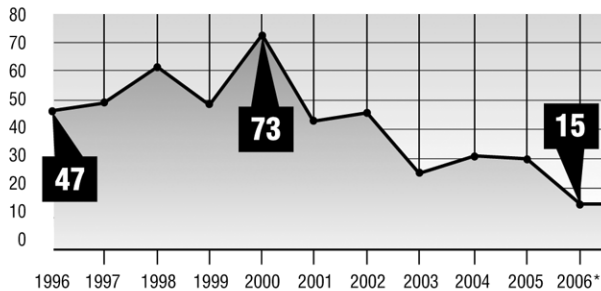
OHIO'S VENTURE-CAPITAL FUNDING DOWN

Gov. Bob Taft began the 10-year, \$1.6 billion Third Frontier project in 2003, promising it would draw more venture capital to Ohio. Both candidates for governor, Democrat Ted Strickland and Republican Ken Blackwell, intend to continue Third Frontier. However, according to accountant PricewaterhouseCoopers, venture funding to Ohio businesses has actually dropped since 2002, down to \$19 million for the first two fiscal quarters of this year.

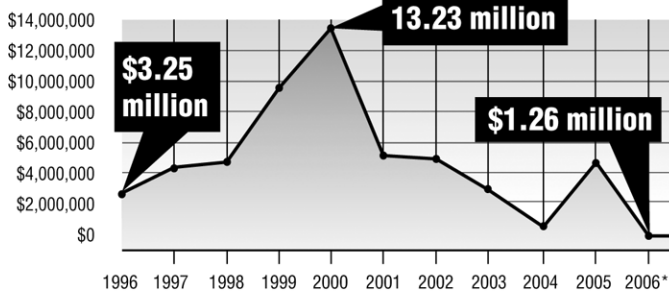
Amount per year



Deals per year



Average value of deals per year



*Through June, 2006

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\$5.56 billion (7.9 percent of the total) it gave Ohio in 1998, according to the National Science Foundation, Mr. Taft's source. Figures for 2004 and 2005 have yet to be released.

Ohio's gross patent numbers are up slightly. But the Fed numbers show the state trails the nation in per-capita patent growth.

Development department statistics show Third Frontier investments have spawned 51

patents and 1,926 jobs with an average salary of \$73,716. The department says \$115 million from the state has leveraged more than \$755 million in private investment.

But Third Frontier hasn't kept its promise to bring more venture capital to Ohio, according to the accounting firm PricewaterhouseCoopers, which reports quarterly on venture funding.

In 2002, the year before Third Frontier, Ohio companies garnered \$232 million in venture

capital, or about \$5 million per deal. During the first six months of this year, Ohio firms got \$19 million total, an average of \$1.26 million per deal. By comparison, the average venture-supported business nationwide got \$7.5 million this year.

Keys to the future

David Morgenthaler still drives his Lincoln Continental to work every morning and logs a seven-hour day.

"I don't work heavily into the night anymore," he says. "Unless I'm traveling."

On the side, Mr. Morgenthaler donates his time and wealth to help the economy of his adopted home state.

He finances regional studies, advises the Cuyahoga County Board of Commissioners, and helps a Cleveland business incubator, JumpStart.

Like Mr. Plosila, Mr. Johnson, Mr. Taft, Mr. Blackwell, and Mr. Strickland, he says Third Frontier is key to Ohio's future.

Mr. Morgenthaler's expertise is money, but experience tells him all his investments — and Ohio's — are in people.

Last year, Morgenthaler Partners recruited the top two students from the Harvard University school of business. The first took a position in Massachusetts. The second rejected one in Ohio.

"In your Boston office, I accept on the spot," Mr. Morgenthaler recalled the second student saying. "In your Cleveland office, never."

Mr. Morgenthaler ended the story, paused, and drew a breath.

"That's just heartbreaking to me," he said, "but that's the reality."

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Ohio's economy is suffering, but not for the reasons you've been told. In a three-part series that concludes today, The Blade explores the state's core economic problems and how the men who would be governor plan to fix them.



SEPT. 17: Ohio's biggest economic problem isn't factory layoffs, and politicians aren't fixing it.

SEPT. 24: As private investors look elsewhere, state efforts fall short.

TODAY: Wanted: 1,000 engineers. (And other tales of the real "brain drain.")

State doesn't keep the right graduates

Science PhDs tend to go elsewhere

Last in a series

By **JOSHUA BOAK**
and **JIM TANKERSLEY**
BLADE STAFF WRITERS

CLEVELAND — The human heart sparks electricity with each beat. When it skips and its rhythm breaks, life turns fragile.

It took Charu Ramanathan, Ping Jia, and their graduate adviser in a Cleveland lab to map the heart to show what trips its electrical circuits. They knew their work belonged in hospitals, so they patented it.

A business was born.

Ms. Ramanathan came to Case Western Reserve University a decade ago to pursue a doctorate in biomedical engineering, which no college in her native India offered. Ms. Jia left China for the same reason.

The world sends many of its best minds to Ohio universities each year, where they perform

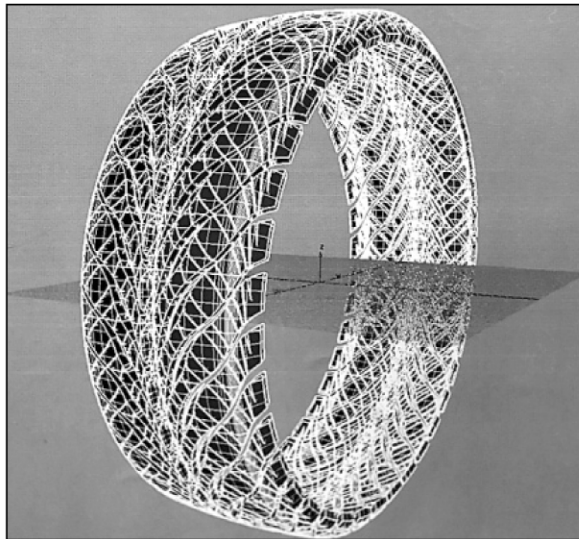


Charu Ramanathan, left, and Ping Jia are PhD researchers in Cleveland who patented their heart-mapping work.

ground-breaking research. That research spawns patents, which are one of the best predictors of a state's wealth and lead to new companies — the kind of firms that the leading candidates for governor call vital to the state's economic future.

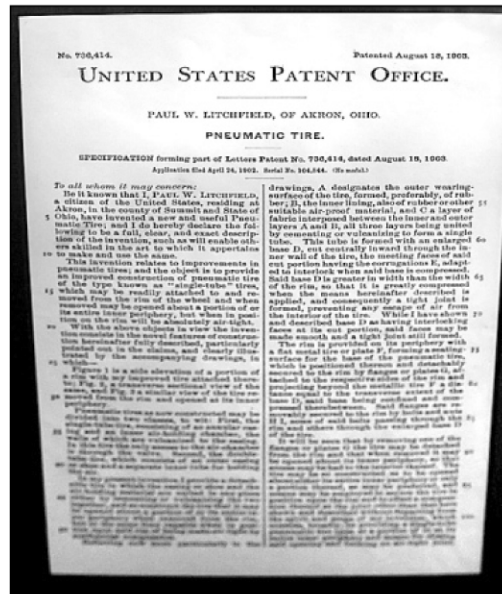
But Democrat Ted Strickland

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The Goodyear Technology Center in Akron features displays of computer-drawn sketches of tires from recent years, above. At right, Max Dixon continues his work on tread development at the research facility.

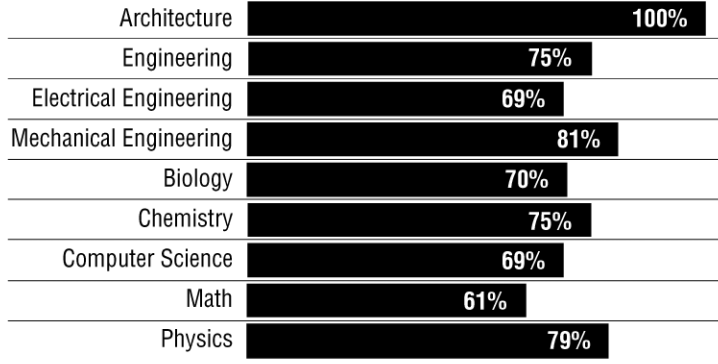


The original 1903 U.S. patent awarded to Paul Litchfield for inventing his pneumatic tire is on display at the Goodyear Technology Center in Akron.

DOCTORAL GRADUATES WHO HAVE LEFT OHIO

New PhDs have left Ohio in large numbers, according to a 2002 report by the Ohio Board of Regents. The state oversight group no longer documents migration patterns among graduate students who are not Ohio natives. The outflow of PhDs in science and engineering is due to a highly competitive national job market, the report says.

Ohio PhD graduates from 1998-2001 who left the state.

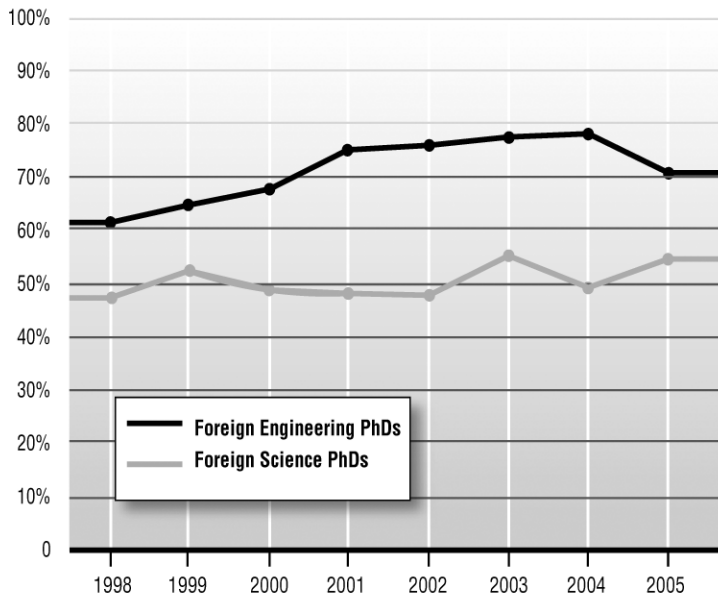


*The Ohio Board of Regents

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FOREIGN STUDENTS IN SCIENCE AND ENGINEERING AT OHIO UNIVERSITIES

Ohio's doctoral students in engineering and science come from around the world. About half of those who graduate with doctorates in these fields are not U.S. citizens. Ohio does not keep track of how many stay in the state after graduation.



*The Ohio Board of Regents

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Ping Jia, left, and Charu Ramanathan, both of Cleveland, represent the kind of PhDs in sciences that Ohio needs to attract and retain. Such researchers help stoke inventive economies.

Research

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and Republican Ken Blackwell rarely discuss the researchers behind those breakthroughs.

Instead, the candidates talk a lot about "brain drain," the flight of homegrown college graduates from the Buckeye State.

Maybe they should go back to school.

In fact, Ohio keeps more of its college graduates than the average state, a recent study of 1.11 million alumni records found. But the state bleeds the scholars who should be the heart of a high-tech economy: people holding doctorates in biology, chemistry, and engineering.

At a time when Ohio's economy needs more and better ideas, the state isn't losing young minds, it's losing the most educated young minds.

A matter of degrees

Ted Strickland interrupted a busy day of fund-raising on Aug. 31 to address a small crowd of reporters at the University of Toledo. Flanked by students and shaded by the stone tower of University Hall, the southeast Ohio congressman attacked rising tuition costs and what he called a critical problem facing the state. "Ohio leads the nation in young people leaving the state and going elsewhere," Mr. Strickland declared. He promised to reverse the trend by creating "decent-paying jobs."

Ken Blackwell doesn't often agree with Mr. Strickland. But at a shopping-mall rally in Perysburg the next day, Ohio's secretary of state nearly echoed his opponent. "Right now, too many of our young people believe that the only way that they can go up is to go out," Mr. Blackwell said, adding: "There's no more important job for the next governor of this state than putting an Ohio option back into the hands of our young people."

University of Toledo research suggests both candidates for governor are misguided.

UT's Urban Affairs Center analyzed 1.11 million alumni records of Ohio graduates between 1980 and 2003. It found more than 80 percent of those who graduated between 2000 and 2003 did not leave for "cool cities" along the coast. They stayed in Ohio. Out of the entire 24-year pool of alumni, 70 percent are still Buckeyes.

Between 66 percent and 70 percent of college graduates nationwide continue living in their home state, according to an ongoing survey by the U.S. Department of Education.

"If you can keep someone for three years after they graduate," said Patrick McGuire, the UT sociology professor who authored the study, "you almost always have them for life."

The study detected another trend, which the Ohio Board of Regents confirms. Those with master's degrees, doctorates, and professional degrees are 50 percent more likely to leave Ohio than those with bachelor's degrees.

The average salary for people with doctorates is \$73,892 a year, compared with \$48,724 for bachelor's degree holders, according to the Census Bureau. That income gap is \$6,000 wider than the one between college graduates and high school graduates.

A 2002 performance report issued by the Ohio Regents found 70 percent of those holding doctorates in biology, chemistry, and engineering leave Ohio. Graduate degree recipients have job opportunities nationwide, unlike most of Ohio's bachelor's degree holders, later performance reports noted.

The Regents can't give more recent statistics because they stopped measuring overall graduate student migration three years ago.

Of native-born U.S. citizens with doctorates in science and engineering, about 41 percent remain in the state where they attended graduate school, according to the National Science Foundation.

Getting results

Advanced degrees stoke inventive economies. A 1999 study published in the journal *Science* found that PhDs educated in America, but born elsewhere, were more likely to perform ground-breaking research, file patents, and start new companies.

More than half of the graduate students in biology, chemistry, and engineering at Ohio's universities come from abroad. The presence of foreign students pumped \$405 million into the state's economy in 2004, according to NAFSA: Association of International Educators.

Soundararajan Srinivasan had never seen America firsthand when he left India to study biomedical engineering in Ohio State University's doctoral program.

After six months on campus, Mr. Srinivasan chose the topic of his dissertation: how to filter out white noise and focus your hearing on what is important. His work helped him land a job at the Bosch Group in Pittsburgh, an automotive technology firm.

"I interviewed at a couple places in California, Switzerland, GM in Michigan," Mr. Srinivasan said. "Coming out of a grad school with a PhD, you have avenues."

Mr. Srinivasan likes Pittsburgh. He would have preferred to stay in Columbus. But no Ohio business interviewed him.

The money factor

A 2003 analysis of census data by the Governor's Commission on Higher Education and the Economy concluded that Ohio's real obstacle was its inability to attract college graduates from other states. Salaries were higher elsewhere. College graduates who left Ohio made about \$3,000 more a year than those who stayed or moved into the state.

And as top graduate students leave, Ohio universities face increasing pressure from politicians to jump-start an economy that isn't keeping up with the nation.

"A knowledge-based economy requires cooperation between the higher education and business communities," Mr. Blackwell says in his education platform. Mr. Strickland calls investment in university research and innovation "the ultimate answer" to the question of how to create better Ohio jobs.

The pressure comes as Ohio ranks 40th in the country in funding higher education on a student-by-student basis, the Regents note.

In 2004, a state commission proposed to improve Ohio's economy in part by spinning off companies from university research. The idea came late to Ohio, where until 2000 ethics laws prohibited public university professors from licensing their discoveries to businesses.

Ohio universities have improved dramatically in patent revenue since, but they face stiff competition. Michigan State University alone generated \$36 million from licensed patents in 2004. That's \$10 million more than all of Ohio's nonprofit research institutions combined. And only 24 percent of the patents Ohio's universities license go to in-state companies.

Spin-off possibilities

At Case Western, Ms. Ramanathan and Ms. Jia developed software that images a heart in three dimensions. As a result, doctors can treat abnormal heart rhythms with targeted operations, rather than controlling the symptoms through more general therapies, such as medication, implanting devices, or surgery.

The research initiated by their adviser, Yoram Rudy, led to the financing in August of CardioInsight. Ms. Ramanathan and Ms. Jia co-founded the company, which is about to start clinical trials.

Both women have young children. In her spare time, Ms. Jia browses Chinese Web sites because "when you come to Case, the lab is your whole world." She estimates that 90 percent of her classmates left Ohio after graduation.

"That has been my complaint to my husband, that my good friends left," Ms. Jia said.

As a technology transfer executive at Case Western, Joseph Jankowski helped shepherd the work Ms. Ramanathan and Ms. Jia performed in the lab into CardioInsight.

"Grad students and post-docs are the primary researchers and investigators," Mr. Jankowski said. "There's probably not a technology we license that doesn't have input from a graduate student."

No Ohio institution receives more from patents than the Cleveland Clinic Foundation. The clinic's 15,000-square-foot business incubator features a pair of mass spectrometers, which measure the mass and concentration of atomic particles — work too technical for most "tinkerers" with bachelor's degrees.

“By and large,” said Chris Coburn, executive director of the clinic’s innovation division, “what we’re doing is not going to be done in a garage.”

Patents allow universities to translate their research into economic opportunity. But interim Regents Chancellor Garry Walters noted that students must be a college’s primary focus because “the best form of technology transfer is a highly trained graduate.”

Goodyear’s dilemma

Some of Ohio’s top companies say they can’t get the graduates they need from Ohio.

Akron-based Goodyear rode a truckload of new products to renewed profitability in recent years, thanks to a research revolution borrowed from nuclear weapons.

Goodyear previously designed a new tire, built it, tested it, and repeated the process three or four times before it was satisfied, which could take up to three years.

In the 1990s, the Sandia National Laboratories in New Mexico — which devise delivery systems for nuclear warheads — showed the company how to cut the time in half by using computer modeling to test tires before they hit the road.

Goodyear struggles to recruit enough engineers to fill its research staff of 1,000, said Joseph Gingo, the company’s executive vice president for quality systems and chief technical officer.

Ohio’s “rust belt” identity makes it harder to land out-of-state engineers to work the computer testing models, Mr. Gingo said, and in-state schools aren’t producing enough engineers on their own.

“The education system in

Ohio has to be able to supply us with engineers who can apply these tools,” Mr. Gingo said. “This is the way you’re going to have to educate your students in the future. It’s not just my industry, it’s every industry.”

Drawing power

Mr. Gingo has no problem recruiting the kinds of engineers who create the testing models, instead of the ones manipulating them. “The kind of guys that like [computer] modeling,” he said, “if they lived in California and you gave them a great modeling challenge, they will move from San Diego to Akron.”

Some of Ohio’s most innovative thinkers agree that nothing will attract bright minds to Ohio better than opportunity. It’s the conundrum at the heart of the state’s economic struggles: Will great thinkers create great jobs, or will great jobs lure great thinkers?

Mr. Coburn says the Cleveland Clinic’s reputation helped it land top researchers from Japan, Croatia, and Argentina.

“You might have to work harder,” he said, “particularly in February when it’s sleeting, but we get our people.”

Ms. Ramanathan and Ms. Jia could have followed their adviser to St. Louis but chose to start CardioInsight near Case Western. “The high-tech sector,” Ms. Ramanathan said, “especially in the university, the collaborations, made me forget that it is Cleveland.”

A job drew a young World War

II veteran named David Morgenthaler to the Great Lakes. He stayed and in 1968 founded a pioneering venture capital firm in Cleveland, where, at 87 years old, he still manages a \$2.5 billion portfolio.

Mark Schweitzer was a West Coast lifer when he spurned a New York offer to take a research position at the Federal Reserve Bank of Cleveland. He came for the job but stayed for the lifestyle.

“My family actually likes it here,” Mr. Schweitzer said. “We like our neighborhood and we like our schools. It turns out that’s very important.”

Mr. Schweitzer and a colleague, Paul Bauer, recently wrestled 75 years of data into a comprehensive analysis of what affects state economies the most.

It was their study that found a dearth of ideas, measured by patents and education, behind Ohio’s economic woes.

The economists currently are studying detailed patent data to figure out what really breeds brain power in cities and states. They don’t expect to finish anytime soon.

In the meantime, Ms. Ramanathan has a theory based on personal experience. Clearing Ohio’s obstacles to innovation, she said, takes persistence.

“You bang on a door,” she said, “and keep at it, keep at it, keep at it, until the door falls off.”

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