The 2009 results for PISA (the OECD’s test of high school student learning levels) confirmed Brazil’s impressive progress in raising education performance over the past decade. Brazil’s 52 point increase in math since 2000 implies that students gained a full academic year of math mastery over the decade, and Brazil’s overall score increase – from 368 to 401 – is the third largest on record. The country’s 2009 scores still trail the OECD average and East Asian countries by a large margin and are no grounds for complacency, but few countries have made faster or more sustained progress. The PISA secretariat is sending a film crew to Brazil to document the sources of this education advance.

How Brazil moved from one of the worst-performing education systems of any middle-income country to one with strong and sustained improvement, not only in learning but also in primary and secondary school coverage, is one of the central questions addressed in the new World Bank report: Achieving World Class Education in Brazil: the next agenda. By benchmarking the country’s current education performance and identifying key issues, the book is intended as a resource for the new Federal government in setting education priorities for the next four years. But it also tells the story of Brazil’s remarkable run of policy continuity and sustained reform in education over the past 15 years.

A six-year-old Brazilian child born today into the bottom quintile of the income distribution will complete more than twice as many years of schooling as her parents. The average educational attainment of the labor force since 1995 has been one of the fastest on record – faster than China’s, a global leader in schooling ex-
pansion in prior decades. Major performance gaps with middle-income countries in LAC and elsewhere are closing, such as in primary school completion and preschool coverage. And in key areas such as assessing student learning and education performance monitoring more generally, Brazil today is a best practice example not only in LAC, but globally.

The “managed revolution” of Brazilian education began when the Cardoso government assumed critical normative functions at the federal level that had previously gone unfilled: equalizing funding across regions, states and municipalities with the FUNDEF reform; measuring the learning of all children on a common national yardstick (SAEB); and protecting the educational opportunity of students from poor families (Bolsa Escola). With those reforms, plus extending to secondary school and pre-school coverage grew from 4.9 million families in 2002 to 12 million in 2009, with transfers increasing from 3.4 to 11.9 billion reais (about US$ 7 billion in 2009 prices). The testing of a small national sample of students under SAEB every two years was extended to a nation-wide test of math and Portuguese called Prova Brasil and applied to all 4th, 8th and 11th grade students. Combined with data on student enrollment, repetition and graduation rates, a comprehensive index of school performance was generated, called IDEB (Índice de Desenvolvimento da Educação Básica). With an IDEB score for every one of Brazil’s 175,000 primary and secondary schools, 5,000-plus municipal school systems, 26 state and federal district systems, every single segment of the Brazilian education system can benchmark how well their students are learning and how efficiently their school or school system is performing. No other large federal country in the world has achieved this.

Federal, state and municipal-level policies in education have been progressive and innovative in many other areas as well. The Ministry of Education’s strong normative role has included new standards for teachers, federally-supported, higher quality teacher training programs, textbook screening and production. Investment support includes programs such as Mais Educação, and expansion of the federal technical schools. The Federal government has also strongly supported innovation – whether school-level planning under FUNDESCOLA, multi-grade teaching under Escola Ativa, or capacity building for municipal education managers, with the Plano de Ações Articuladas (PAR). And the report acknowledges an even larger wave of innovative reforms at the state and municipal levels – which have core responsibility for the delivery of pre-primary, primary and secondary education in Brazil.

But while Brazil is moving up, the rest of the world is not standing still. The core of the report examines how Brazilian education today stacks up against OECD and LAC countries on three paramount functions: i) developing the labor force skills for sustained economic growth; ii) contributing to poverty and inequality reduction by providing educational opportunity to all; and iii) transforming education spending into education results – above all, student learning. It concludes that while progress has been substantial, the agenda ahead is crucial.

Labor force skills are improving, but still lag behind. Brazil is still quite far from the average learning levels, secondary education completion rates, and student flow efficiency of OECD and other middle-income countries. While Brazil improved more than any other LAC country between 2000 and 2006 on PISA, both Poland (the non-OECD country with the largest gains) and Mexico, the country with the second fastest improvement in LAC, performed better in absolute terms. While the 2009 results are expected to close Brazil’s gap with Mexico, it will still lag OECD, East

Global Impact

The Achieving World Class Education in Brazil report was featured by “The Economist” magazine in December 2010. The article, titled “No Longer Bottom of the Class” highlighted the report’s assessments of the promise of Brazil’s myriad education experiences, especially to improve teacher quality and effectiveness, and the country’s struggle to close the education gap with OECD and other middle income countries.

Figure 1: Brazil VS. Strongest Improvers—PISA Math Performance 2000-2006

<table>
<thead>
<tr>
<th>PISA Score</th>
<th>2000</th>
<th>2003</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>OECD</td>
<td>550</td>
<td>525</td>
<td>510</td>
</tr>
<tr>
<td>Poland</td>
<td>480</td>
<td>480</td>
<td>480</td>
</tr>
<tr>
<td>Mexico</td>
<td>400</td>
<td>420</td>
<td>440</td>
</tr>
<tr>
<td>Brazil</td>
<td>350</td>
<td>360</td>
<td>370</td>
</tr>
</tbody>
</table>

The “While Brazil is moving up, the rest of the World is not standing still”

*PISA Year*
Asian and Eastern European countries by a substantial margin. The implications are serious, as researchers over the past decade have generated compelling evidence that what students actually learn—measured on globally benchmarked tests such as PISA—and not how many years of schooling they complete, is what counts for economic growth.1

The massive expansion of schooling in Brazil over the past 15 years has had dramatic effects on the labor force. In 1993, close to 70 percent of the labor force had not completed secondary school. Today that number is 40 percent. The biggest change is not access to primary school, but the much higher share of children who stay in school through secondary education. The rise in the share of workers with secondary education has been accompanied by a decline in the real wage for secondary education graduates in recent years. At the same time, there has been an increase in the wage premium for higher education graduates, which is consistent with a global pattern of demand for workers with strong analytical skills.

More equal education access is contributing to lower inequality and poverty, but gaps in learning achievement still remain. The issues underlying the low learning attainment of children from poor families become more complex over time. Physical access to schools and household budget constraints recede in importance, while social issues (teen pregnancy, gang and drug involvement), family instability (unemployment, domestic violence, homelessness), and learning issues and developmental deficits stemming from children’s earliest years become more prominent. Since the core equity issue in Brazilian education has shifted from equalizing access to equalizing learning attainment, secretaries of education across Brazil are increasingly focused on two major strategies to address this, which are both consistent with global best practice: preventive interventions (expanding Early Childhood Development services for low-income families) and remedial interventions (tutoring, accelerated learning programs and other programs targeted to children with special needs).

Education spending is outpacing results. The report raises concerns about a mismatch between Brazil’s current level of spending on public education and results, especially in light of the government’s proposed target of 7 percent of GDP for education. First, in 2007, Brazil’s spend-

---

ing on public education (5.2 percent of GDP) was already above the OECD average of 4.8 percent of GDP (total spending on education in OECD countries, including private spending, was higher, but comparable data on private education spending in Brazil are not available). As the school-aged share of the population is larger in Brazil than in most OECD countries, this is to be expected. However, Brazil also spends more than Mexico, China, India and Indonesia, which have similar demographic profiles. Second, Brazilian GDP is growing rapidly, faster than the school-age population. But third and most importantly, Brazil is experiencing a demographic transition that will have a dramatic impact on the school-aged population over the next decade. The projected 23 percent drop in the number of primary school students will mean almost 7 million empty seats in primary schools across the country. Were Brazil to follow the Korean example and hold class size constant over this period, the primary school teaching force would decline by over 200,000 (from 840,000) by 2025. This transition is a bonus for the education system and would permit current spending levels to finance a large increase in schooling quality.

In this context, the report suggests that the pursuit of spending increases should not detract attention from the areas where comparative data show that Brazil’s current level of spending should be producing better results. Among these are: anomalies in the allocation of public funds across different levels of education – while OECD countries spend on average 2 times as much per student in tertiary education as at the primary level, Brazil spends almost 6 times as much; persistent high repetition and high costs per graduate; rising teacher costs (several policies over the past decade have raised teacher costs with little evidence – either in Brazil or elsewhere – that this contributes to improved results); innovation, privately-supported programs and substantial investments in new technologies with little cost-effectiveness research; and mismanagement of education funds.

**Four key challenges for Brazilian education from 2010-2020.**

Grounded in this comparative assessment of Brazilian education vis-à-vis OECD and LAC comparators, the report zeroes in on four critical challenges for the coming decade: raising teacher quality; protecting the early development of the most vulnerable children; building a world-class secondary education system; and maximizing the impact of federal policy on basic education – especially by capitalizing on the Brazilian “education action lab.”

**Raising teacher quality.** In Brazil, teaching has become a low-status profession that does not attract high academic performers. Data show that teachers are recruited from the bottom third of high-school students – in contrast to Singapore, Korea and Finland, where they come from the top third. Raising teacher quality in Brazil will require recruiting higher-capacity individuals, supporting continuous improvement in practice, and rewarding performance. Both the federal government and some state and local government have already begun reforms in these areas, such as with teacher bonus (pay for performance) programs in Minas Gerais, Pernambuco and São Paulo states and Rio de Janeiro municipality. With support from the Bank’s education team, school systems are also using standardized classroom observation methods developed in OECD countries to look “inside the black box” of the classroom and identify examples of excellent teacher practice that can anchor their professional development programs. In Minas, Pernambuco and Rio municipality, data showed that while the OECD benchmark is 85 percent of each instructional hour effectively spent on learning activities, in no Brazilian system to date has this exceeded 66 percent. A high share of teachers also failed...
to use available learning materials and between 43-64 percent of the time, students were visibly not engaged (in OECD countries, the benchmark for students “off task” is 6 percent of time or less). Instead of theory-oriented courses, training programs designed from classroom observation evidence use videos and practical exercises to impart effective techniques for managing the classroom, using learning materials and keeping students engaged and on-task. This practice-oriented training is the new direction in OECD countries and key states in Brazil are ahead of the curve.

Protecting early child development (ECD). Global research points to ECD interventions as the most powerful strategy for reducing inequality and leveling the education playing field. Over the past 15 years, Brazil has made progress in raising crèche enrollments from 8 to 18 percent of the 0-3 age group and pre-school enrollments from 49 to 80 percent. Priorities for the next decade are improving the targeting of services to the lowest income, most vulnerable children, and raising quality. The report recommends introducing curricula tailored to each educational level; more intense training and supervision of caretakers and educators; and strengthened monitoring and evaluation of ongoing programs. In each of these areas, there is a role for the Ministry of Education – in providing guiding materials and oversight – as well as the state or municipality – in implementing programs.

Building world class secondary education. No segment of the Brazilian education system crystallizes the quality gap with OECD countries as clearly as secondary school. Fully 42 percent of secondary students are enrolled in night shifts, which deliver only 4 hours of instruction a day – compared with 7 hours or more in most OECD countries. Infrastructure is deficient – lacking the libraries, science labs, computer and language facilities most OECD students enjoy. The curriculum is overloaded and memorization-oriented, and virtually every state secondary school system faces severe shortages of qualified math and science teachers. As a result, 40 percent of all Brazilian secondary schools are considered “dropout factories” – failing to graduate 60 percent of their students.

The challenges are extreme, but a number of states are already working on comprehensive strategies. Some, such as Minas Gerais, are developing important new approaches to a key issue for secondary education: the balance between academic and vocational content. Promising directions which can contribute to improvement in secondary education in Brazil can be loosely grouped as: system-wide strategies (curriculum and training reform, major infrastructure investments to support a longer school day and eliminate evening instruction, improving teacher quality); demonstration schools (full-day, highly resourced secondary schools that both test out innovations and demonstrate that high quality secondary schools are achievable); and public-private partnerships for technical and vocational education (to ensure a smooth transition to work for secondary education graduates who do not go on to higher education, by orienting the vocational content of the curriculum to skills that are in local demand and supporting more results-driven school management).

Figure 6: Spending per Student at Different Education Levels Relative to Unit Costs in Primary Education (2007) Primary Education = 100

Note: A ratio of 300 for tertiary education means that expenditure by educational institutions per tertiary student is three times the expenditure by educational institutions per primary student. A ratio of 50 for pre-primary education means that expenditure by educational institutions per pre-primary student is half the expenditure by educational institutions per primary student.
1. Public institutions only (for Italy, except in tertiary education).
2. Some levels of education are included with others.
Countries are ranked in descending order of expenditure by educational institutions per student in tertiary education relative to primary education.
Maximizing federal impact and capitalizing on the Brazilian “education action lab.” Given the progressive, effective education policies pursued by successive Federal government administrations over the past 15 years, the report states that “in this context, it is not trivial to identify policies that could substantially speed Brazil’s progress toward world class basic education.” But the analysis points to four recommendations:

- **stay the course** on the core policies of the last 15 years (FUNDEB funding equalization; IDEB results measurements; and Bolsa Família conditional cash transfers);
- **focus on spending efficiency** rather than targets for higher spending, which can worsen the risks of leakage and mismanagement in the system;
- **create incentives for state-wide improvement** to reward states for closer integration of state and municipal school systems, rather than directing direct federal support to small municipal education systems;
- **capitalize on the Brazilian “education action lab”** by supporting systematic evaluation of innovative state and municipal programs.

Of these four recommendations, perhaps the last holds the most potential impact. The long-term work of improving primary and secondary school performance is the responsibility of over 5,500 state and municipal schools systems in Brazil. Literally tens of thousands of creative new programs and policies are being tried out at this moment across Brazil by dynamic, results-oriented secretaries of education. Few other countries in the world have the scale, scope and creativity of policy action that can be seen today in Brazil. Even more unique is the large number of cutting-edge policy areas in which different states and municipalities are experimenting with similar programs with slightly different design features – such as the pay for performance programs in Minas Gerais, São Paulo, Pernambuco and Rio de Janeiro municipalities. The chance to study these systematically makes Brazil one of the world’s best laboratories for generating global evidence on “what works” in education. A concerted federal effort to mine this rich experience more effectively through rigorous impact evaluation might be the single fastest route to world class education.

---

**Brazil Knowledge Day: A “South to Bank” Exchange**

By Mauro Azeredo

Knowledge is a central dimension of the Bank’s work in Brazil. It represents much of our value-added and is what clients ultimately seek, especially when it is one with operations. The country can be thought as a very special case. It is an über MIC, with very sophisticated challenges and capacity, and fundamental contributions to international development and the global policy debates.

Bringing this knowledge and experience to other teams in the Bank could be a significant contribution to our effectiveness and innovation.

It was with this in mind that the Country Office organized the “Brazil Knowledge Day” in December 2010 in DC. The event was opened by the World Bank’s Vice-President for Latin America and the Caribbean, Pamela Cox, and Brazil Country Director Makhtar Diop and drew strong media attention. Several authorities, among which the Brazilian Ambassador to the U.S., participated.

**Transparency and Competition**

The Brazil Analytical and Advisory program, under the leadership of Lead Economist Tito Cordella, is based on a transparent competitive process with a focus on themes of interest to the country dialogue. Reports have close supervision for quality assurance and tailored partnership and dissemination strategies.

The result are highly influential and innovative products, some of which were showcased in the Brazil Knowledge Day. The full day discussion was divided into three broad sessions, focusing on the human capital, opportunities and the green agendas.

Tamar Atinc, World Bank Vice-President for Human Development, chaired the first session, which highlighted four closely related studies, from early child development to Brazil’s aging population, passing through the country’s challenges in education and job market development. Discussants Ariel Fiszbein (Chief Economist of the Human Development Network) and Nancy Birdsall (Center for Global Development) commented on the presentations by Michelle Gragnolati (Brazil HD Sector Leader) and Barbara Bruns (Lead Education Economist).

Brazil’s drive to provide opportunities for all its children, a central goal of the Rousseff administration, and its long struggle with crime and violence were the focus of the second session, chaired by the Bank’s Poverty Reduction and Economic Management Vice-President Otaviano Canuto. Pablo Fajnzylber, Brazil PREM Sector Leader, and Laura Chioda LAC Research Economist, presented the reports, which were commented by the World Bank’s Chief Economist for the Africa Region, Shanta Devarajan and Mauricio Cardenas (Brookings Institution).

Finally, the Bank’s analytical program in an environmental superpower such as Brazil could not lack a strong sustainability component. Sector Director Laura Tuck and Brazil Sector Leader Mark Lundell presented two seminal reports, which are influencing public policy in Brazil: the Brazil Low Carbon and Amazon Dieback assessments. Marianne Fay, Chief Economist of the Sustainable Development Network chaired the session, with comments from Andrew Steer, Special World Bank Envoy for Climate Change, and Joelle Chassaard, Manager of the Carbon Finance Unit.

The Bank’s knowledge work is geared to have maximum usefulness and impact on government policy, and our clients and stakeholders in Brazil are appreciative of this contribution. Brazil generates much knowledge and South-South exchanges, and it is natural that the broader experience behind the Bank’ analytical engagement also benefit the institution as a whole, in what could be accurately termed a “South to Bank” exchange.
MINAS GERAIS: READY FOR THIRD GENERATION OF PUBLIC SECTOR REFORMS

Interview with Minas Gerais Governor Antonio Anastasia

By Denise Marinho

For two decades, Antonio Anastasia held increasingly important technocratic positions in state and federal administrations, becoming an expert in public policy management.

In 2003, as secretary of Planning for the State of Minas Gerais, Anastasia was responsible for implementing a highly effective and innovative public sector management program, widely known as “Choque de Gestão” (Management Shock). The idea was to improve public administration through the adoption of targets and indicators, to make public investments more efficient and improve public services to the population. The program was expanded and strengthened in the second term of Governor Aécio Neves, in which Anastasia was Vice-Governor.

The program’s success has enabled the Government of Minas Gerais to put its finances in order, pay civil servants salaries on time and foster public investments, especially in public safety and education areas. It was only natural that Anastasia was chosen as Governor Neves’ chosen successor, and he won the 2010 ballot with 63 percent of the votes.

In an exclusive interview with the Quarterly, Governor Antonio Anastasia explains how the State will trigger the “third wave” of this model of public management, which he calls “Management for Citizenship.”

Brazil Economic Team: Minas Gerais was the pioneer Brazilian State in developing a management model based on results and you are one of the main mentors behind this program. What led Minas Gerais to adopt this management paradigm?

Antonio Anastasia: Minas Gerais is the reduction of these inequalities through the improvement of social, economic, and physical infrastructure, as well as the creation of opportunities.

In 2002, when Governor Aécio Neves was first elected, he invited me to serve as coordinator of the Government’s plan and, in the post-transition period, as Secretary of Planning.

This effort therefore began in 2003, and involved a momentous process, with the assistance of many partners including the World Bank and the Dom Cabral Foundation. When our partnership with the World Bank started in 2003, we did not have the tools, let alone the technical expertise, to take the first step.

But we knew that the public administration in the State was in dire need of improvement, professionalism had to be introduced, goals and results established, procedures streamlined, and the mechanisms that had led to private sector success needed to be identified and adapted to the public sector. The overarching idea was one of “management shock.”

What was our major objective? To demonstrate that public administration should not be handled in an amateur fashion. It had to be professional and, to achieve this, results and goals had to be set, and individuals and managers had to be accountable. The situation had to change. Unfortunately, in our culture, public administration was like a no man’s land. There was no owner and, for this reason, there was no accountability.

BET: What effects this new management approach had on the role of government?

Anastasia: For instance, Minas Gerais has 853 municipalities and 225 of them had no paved road. What is the paved road to a city? It is an entry route; is the way to access opportunities, jobs, businesses and the conditions of development and progress.

So, since 2003, during the first term of Governor Aécio Neves, we developed a large and ambitious project called “Pró Acesso”, with the Bank’s participation from the onset.

Now, nearly 200 municipalities of those 225 have paved roads, something that nobody imagined that could be done. Paved roads mean much more than the mere physical access. They represent opportunities and connection to a broader context of services and development for these small towns. Because now they have the possibility to attract businesses to generate jobs and income for local people.

BET: What effects this new management approach had on the role of government?

Anastasia: We achieved spectacular results, first in terms of motivation of civil servants, who were initially fearful of layoffs. However, the reverse happened. We’ve hired 40,000 new civil servants through competitive examination, and salaries began to be paid on time. There were salary increases and we were able to adopt productivity goals to grant bonuses known as the “14th salary,” a
Minas Gerais’ Public Sector Management Revolution

Minas Gerais emerged from the 1990s facing a very difficult fiscal situation. In 1999, the state government declared a default on its state debt with the federal government.

Since 2003, the Minas Gerais state government has promoted a strong fiscal adjustment strategy. Under a program called Choque de Gestão (Management Shock), the state government defined a set of measures directed to curb the increasing trend of expenditures through tight control of personnel and operating costs.

Results were immediate and impressive. Since 2003, the state government has obtained vigorous primary surpluses. As a result, the state consolidated debt fell markedly, increasing investment capacity.

The Minas Gerais Partnership for Development, supported by over $1.5 billion in loans from the Bank, has moved the reforms further, creating Brazil’s pioneer results-oriented management environment, in which public servants commit to targets and receive incentives to meet them.

The successful program is now being emulated in other states and municipalities. The Bank was also instrumental in sustaining Minas’ broad reorganization and modernization of the state public administration and helping the state boost sustainable economic development through promotion of private sector investments.

What was the effect on the average citizen? Positive. As we improved education, health, and security indicators, works and investment expanded and Minas Gerais joined the ranks of Brazilian states with greatly improved indicators.

Minas became the second major employer in the country. Given our great heterogeneity and regional inequalities, it is wonderful to see that Minas Gerais currently ranks first among states in basic education according to the Brazilian Index of Basic Education Quality (IDEB), and third in sanitation. We are fortunate to have security indicators that make us the safest state in Brazil in terms of per capita homicides.

Naturally, while the results for citizens are positive, much remains to be done. However, progress has been impressive.

BET: Is it possible to improve the effectiveness and efficiency of the Government through this management model? How?

Anastasia: I have always been an advocate of good governance. While sound administrative management is not the end goal of the State or public authority, it is the bedrock of all public policies.

We will never have high-quality education, high-quality public health, and sound public security in Brazil if we do not take into account that efficient governance underlies and supports all these policies. On the contrary, even if resources, good will, and a good technical team were available, it would not be possible to achieve the desired results without sound governance.

BET: What are Minas’ next steps?

Anastasia: During former Governor Aécio Neves’ first term, the “Management Shock” program was introduced. The goal was to put the house in order. During the second term, the notion of the “results-based State” was introduced to provide citizens with concrete governance results.

Now, the third wave is the so-called “Management for Citizenship” (Gestão para a Cidadania), which seeks to stimulate citizens to increase their interaction with public authorities, to participate and to be active citizens.

To accomplish this, we developed the idea of a government network, launched in my government platform. We are now making preparations for the next four years. Here again, our goal is for citizens to play an active rather than passive role in public policies, since we know that to achieve effectiveness, citizens must engage in such policies as education, health, and security, which are the most important.

BET: And how this will be achieved?

Anastasia: This participation will be achieved through a government network system. For example, we will launch a project called “Family Teacher” (Professor da Família). What is the rationale behind this? In the case of education, we know that we can improve schools and teachers. However, if a family does not encourage a child or adolescent to study at home, he or she will fail.

As part of this program, we will go to homes to visit students with the worst grades and to encourage family participation.

BET: Have other Brazilian States expressed interest in learning more about this management model?

Anastasia: First of all, we are the product of a successful undertaking, given that we received major incentives from external sources, including the World Bank, for which we are very grateful.

Of course, we’ve managed to “tropicalize” this experience, and make it more from Minas Gerais, and it became a successful case. We’re always willing to share this experience. Minas Gerais is open to receive visiting mission and also send our technicians, because we believe that this fosters improvements and is a requirement of solidarity.

We’ve done that, receiving several missions from other states and municipalities. We also visit other states to learn from their good ideas. So there is already a Brazilian collaboration spirit. On the same way, we have welcomed developing countries that can benefit from this management model.
This article describes and analyzes the wage convergence between formal (com carteira) and informal (sem carteira) employees in Brazilian metropolitan areas from 2002 to 2010. Social policies resulting in higher reservation wages have been pointed as the main factor associated with this wage convergence. However, monthly employment survey data show that what drives the phenomenon is the fact that the wage premium for high levels of schooling has decreased in the formal sector but not in the informal one. Therefore, the convergence is actually observed in the upper level of education (and consequently, income) distribution, and not in the lower ones as the social policies-reservation wages channel would have suggested.

Brazilian labor market has been responsible for the most important part of the impressive reduction in the country’s inequality over the last decade. Unemployment rates have fallen systematically and recently reached the lowest recorded level. Surprisingly, however, informal employees’ wages are growing faster than those of formal employees. This is reflected by a 36 percent increase in the ratio between the average monthly wage of full time informal workers and full time formal workers, from 2002 to 2010, going from 60 percent to 81.7 percent in the period (Figure 1).

A recent study by Fernando Holanda Barbosa attributed the growth in informal sector wages to the growth in the minimum wage and the reservation wage increase created by social programs. According to him, poor people in the informal sector request salary raises when the minimum wage is increased, so that the minimum wage acts as a reference index for informal sector adjustments. A similar increase of the minimum wage and of informal wages reduces the informal/formal wage ratio. In addition, programs like Bolsa Família tend to increase the reservation wage of the poorer, which would make workers refuse bad jobs, pushing informal wages up.

However, the evidence presented in this article points in another direction. Although some increase can be seen in the wages of formal employees in the low levels of the education distribution, the average real wage has been fairly stable from 2002 to 2010 for formal employees with a complete secondary education; and actually decreased for workers with university degrees, from R$ 4,567 to R$ 3,620. That is: the more educated the worker, the less it has benefited from the growth in real wages over the last eight years.

In the informal sector, the dynamics has been quite the opposite: while a small increase is noticed for the low levels of education, wages increased very fast among higher education levels for the informal employees, from R$ 3,080 to R$ 3,565 on average for workers with univer-
University degrees. Consequently, the ratio between informal and formal wages increased 15 percent for workers with a complete primary education, 17 percent for workers at the secondary level, and an impressive 46 percent for university graduates. Convergence has thus been higher for workers with more education. This evidence contradicts the interpretation that the increase in informal wages comes from the reservation wages of some social policies, since the faster convergence is noticed in the upper part of education (and consequently wage) distribution.

A decomposition was made to check if the changes in the composition of observed characteristics (such as years of study, experience, gender, race, region, household position and training) play an important role in the reduction of the gap. We find that these changes explain only 29.7 percent of the wage convergence. Another 20.3 percent is explained by common changes in returns of the characteristics (for example, changes in returns to education will affect more formal workers, as they are still more educated). Finally, 50 percent of the reduction of the gap is explained by changes in unobservable characteristics and by changes in the way these unobservable characteristics are paid (for example, the reduction in the difference of returns to education between formal and informal employees).

Figure 2 shows returns of education levels for the formal and informal sectors. The education levels used as reference were incomplete primary and no education. It is observed that the wage premium for high skill levels of education (complete university and complete secondary) has decreased in the formal sector from 2002 to 2010. The same thing is not observed for informal employees. For them, the complete university wage premium has fluctuated around the initial level in the period, with no observable trend, and the complete secondary wage premium, after a decrease from 2002 to 2003, has been almost stable from 2003 to 2010.

An interesting fact comes out when we look at the returns to education by economic activity sectors. For industry, the wage premium for informal workers with a complete university education has increased from 2002 to 2010 (Figure 3). At the same time, the share of informal workers in industry with a complete university education, although increasing, is still much below the share of formal workers with that education level, hinting that this could be one of the reasons why the wage premium is still increasing for this education category.

In summary, the well-documented fall of wage premiums for high skilled workers can be observed only in the formal sector. The same pattern is not observed in the informal sector. This disparity is even more prominent in the industrial sector, where the wage premium has increased for informal employees. Moreover, the changes in observable characteristics (including education distribution) are responsible for only 29.7 percent of the wage convergence. The other 70.3 percent are explained by changes in returns (observable and unobservable) and changes in unobservable characteristics.

It seems fair to conclude that social policies, such as the increase in minimum wages and the conditional cash transfers like Bolsa Familia, are not driving the wage convergence between formal and informal sectors. If social policies are not driving the formal-informal wage convergence, natural candidates appear to be the dynamics of the labor market itself, in a context of higher steady-state economic growth. It might be the case that formal market rigidities prevent formal employees to fully capture economic benefits of this enhanced growth, while informal workers are better able to adjust their wages to the growing value of their work.
TOTAL FACTOR PRODUCTIVITY AND ECONOMIC GROWTH: STATIC AND DYNAMIC LINKS

By Guilherme Lichand

What are the determinants of productivity in Brazil? Is it true that richer states are also the most productive ones? Or that most productive states are those filing more patents, or with the higher share or personnel in R&D activities? In order to shed some light on these important questions, this piece investigates how Total Factor Productivity (TFP) at the state level in Brazil over the last 30 years covariates with measures of economic activity (such as investment in physical capital, access to basic services and exports), innovation outputs (e.g., patents filed) and innovation effort (e.g., personnel in R&D activities).

The productivity debate has a long story in economic literature. With decreasing returns to the accumulation of factors of production in the long-run, when at least one input is fixed (e.g., land), only technical change could drive economic growth. Notwithstanding its relevance, it is generally agreed that there is a lack of understanding about what exactly productivity stands for and what are its growth drivers.

Total Factor Productivity, its most common empirical measure, can be best understood as the “measure of our ignorance” (Abramovitz, 1956) about what drives economic growth besides factor accumulation and returns to scale. Surprisingly, maybe, the contribution of TFP to growth exceeds by far that of factor accumulation (over 50 percent of GDP per worker growth even by more recent accounts, see for instance Abramovitz and David, 2000). That makes it even more important to deepen our knowledge about the nature of TFP, how it is linked to GDP growth and how policy could affect it.

This piece looks at the links from TFP to growth. Recent research (see for instance Hsieh and Klenow, 2009) suggests that one of its most prominent links to economic growth might be malfunctioning financial markets, operating though capital misallocation. More precisely, if firms facing high wedges (distortions to the market price of capital under a perfectly functioning financial market) do not exit the market for some reason, this would prevent output from adjusting along the equilibrium path towards high-TFP firms that face a lower price of capital. In addition, it can also be the case that high-TFP firms face disproportionately high capital prices. This prevents those firms from growing by accumulating more capital, whereas low-TFP firms accumulate ‘too much’ capital in countries like China or India. This would negatively affect growth as long as investment and innovation do matter for growth.

As such, focusing on TFP as a public policy benchmark would be useful as long as this measure is indeed correlated with innovation and investment. This piece investigates whether that is the case at the level of the Brazilian states. Although the ideal level of analysis would be the firm, this preliminary exercise can possibly shed some light on the correlations between the variables of interest, pointing out the relevant questions for future research under a more precise identification setting.

Data for TFP at the state level (for 24 states, excluding only MS, RO and RR), from 1981 to 2008, draws upon Jivago Ximenes’ work (to be published), and is displayed in Figure 1 above as the share to São Paulo’s TFP, which leads the TFP ranking.

It is apparent that if any convergence in TFP levels among States has taken place over time, it is a “convergence to the bottom”: while the distance between São Paulo and the other states only increased over the last 25 years, initial dispersion is reduced, and in 2008 no other state had more than 20 percent of SP’s TFP. Nonetheless, there is a strong association between the rankings of TFP and GDP, with richer states displaying higher TFP.

Figure 2 on page 12 highlights a distinguishing feature of the data: TFP current levels are not correlated with their subsequent variation. In fact, the previous figure also does not back ‘club convergence’ – where high-TFP states have higher TFP growth while the opposite is true for the lagging ones.

This pattern has important implications for policy: units of analysis with higher TFP are not those experiencing higher TFP growth. If TFP growth (as opposed to its levels) is thought of as the result of investment and innovation, then the fact that wedges are disproportionately higher among high-TFP firms is of little interest to understanding the impact of capital market imperfections to economic growth.

We proceed to look at the correlation of TFP levels and growth to more concrete...
variables usually regarded as sources of economic growth. Since we deal with states as opposed to firms, we also consider indicators of urban services and activity composition. Data for access to adequate water and sanitation, exports, investment and schooling, and for the share of manufacturing and services in GDP are drawn from IPEADATA\textsuperscript{1}. Data for our nine measures of innovative effort come from the Brazilian Institute of Geography and Statistics’ industrial surveys on innovation (PINTEC) for 2000, 2003, 2005 and 2008, available only for 13 States.

The descriptive statistics for two variables of innovative effort presented for selected states in figures 3A and 3B are surprising, with poorer states’ firms allocating resources to innovation to a greater extent. This is particularly interesting in the light of our previous finding concerning the association between TFP and GDP levels: it must be the case that states with higher innovative efforts are precisely those with lower initial TFP. Of course, this is merely suggestive evidence, it would be interesting to assess whether there is a consistent pattern over time and if any correlation exists between TFP, innovation and GDP, whether this association if found to be in levels or changes of the variables.

With that in mind we moved on to empirical exercises. We run four specifications, always looking at the pairing correlation between TFP and another variable of interest: (1) with both variables in levels, (2) with state fixed-effects, implying that our coefficient mimics that of a regression with both variables in changes, (3) with only TFP in changes, and (4) with TFP in changes and state fixed-effects, implying that our coefficient mimics that of a regression of TFP second-order change on the other variable’s change. All specifications include year fixed-effects to control for non-observable factors that vary along the time.

As such, the idea is to capture the relevant reduced-form dynamic between TFP and the variables of interest. Moreover, we run the four specifications for five different definitions of TFP: (i) contemporaneous to the covariates, (ii) leaded on year, (iii) leaded 3 years, (iv) lagged one year, and (v) lagged three years, since there might be a non-linear association between these variables that would not be captured otherwise. Variables are used in natural logarithmic form so that our estimates correspond to (semi-) elasticities. For the sake of expositional simplicity, we display empirical results only qualitatively, so that (+) indicates a pair-wise correlation positive and significant at the 10% level, (−) indicates a pair-wise correlation negative and significant at the 10% level, and (0) a pair-wise correlation non-significant at the 10% level. Results for economic activity, access to services and physical investment are omitted from the tables so that we can focus on the innovation variables; the complete set of results is available upon request.

Results are condensed in Tables 1A, 1B, 2A and 2B – each cell of the tables stands for a different regression. In Table 1, the first set of coefficients of interest is that of levels-on-levels regressions.

\textsuperscript{1} http://www.ipeadata.gov.br
In conformity with the evidence suggested by descriptive statistics, TFP is positively correlated with GDP, exports and investments, but negatively and statistically significantly correlated with several measures of innovative effort at the state level such as percent of innovative firms (and its adjusted measure that accounts only for higher impact innovation), percent of innovative firms that implemented advanced management techniques; and is negative though not statistically different from zero with almost every other measure from PINTEC. These findings are very homogenous across definitions of TFP: analogously to contemporaneous TFP and its leads, regressions with lagged TFP present the same patterns showed in table 1. The evidence, hence, is not consistent with targeting high-TFP states in the sources of innovative effort, though these states indeed invest in physical capital and grow at faster rates.

When we move to the changes-on-changes regressions (Table 1), while almost no coefficient is significant, the sign of the coefficients of the regressions with the innovation variables are basically all reversed to positive. The dynamic link is more clearly seen on the changes-on-levels regressions (Table 2): contemporaneous TFP variation is positively and statistically significantly correlated with percent of innovative firms and percent of innovative firms that implemented advanced management techniques. However, the dynamics are not homogenous when one considers lagged- or leaded-changes: an increase in innovative effort increases current TFP and boosts TFP variation one year ahead, but the effect is not significant for TFP 3 years ahead (Table 2A). Conversely, states with previous increases in TFP display a significant decrease in TFP and boosts TFP variation one year ahead, but the effect is not significant for TFP 3 years ahead (Table 2A). Conversely, states with previous increases in TFP and increases in TFP display a significant decrease in TFP and boosts TFP variation one year ahead, but the effect is not significant for TFP 3 years ahead (Table 2A).

These results indicate non-linear dynamics of TFP and innovation over time, with innovative effort cycles matching fluctuations in productivity. As such, these are at least suggestive of a new reading of productivity-driven public policies: if one is concerned about the effects of capital market imperfections on economic growth, he/she should care about the distribution of capital price wedges in what comes to innovation propensity or capital expenditures; since current TFP does not predict TFP growth, the potential reallocation gains from a static perspective might be dynamically misleading, either because of adjustments along the equilibrium path or because innovation variables traditionally understood as sources of economic growth are not (or are even negatively) correlated with current TFP, but rather with TFP growth, and in a rather non-linear, cyclical fashion over time.

In this sense, the literature that investigates how R&D expenditures follow a suboptimal pattern due to economic cy-

---

**Table 1A: Levels Regressions (Contemporaneous TFP and Leads)**

<table>
<thead>
<tr>
<th></th>
<th>Contemporaneous TFP</th>
<th>1-year-ahead TFP</th>
<th>3-year-ahead TFP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level-level</td>
<td>Δ−Δ</td>
<td>Level-level</td>
</tr>
</tbody>
</table>

| % of innovative firms  | -                   | 0               | -               | 0               | -           | 0               |
| % of innovative firms (innovations that account for over 10% of revenues) | - | 0 | - | 0 | - | 0 |
| R&D expenditures (% of revenues) | 0 | 0 | 0 | + | 0 | 0 |
| Skill profile (% of R&D personnel with university degree) | 0 | 0 | 0 | 0 | 0 |
| % of innovative firms that deposited patents | 0 | 0 | 0 | 0 | 0 |
| % of innovative firms that implemented advanced management techniques | - | 0 | - | 0 | - | 0 |
| % of innovative firms that implemented change in organizational structure | 0 | 0 | 0 | 0 | 0 |
| % of innovative firms that implemented new marketing strategies | 0 | 0 | 0 | 0 | 0 |
| % of innovative firms that implemented changes in products design | 0 | 0 | 0 | + | 0 | 0 |

**Table 1B: Levels Regressions (TFP Lags)**

<table>
<thead>
<tr>
<th></th>
<th>1-year-behind TFP</th>
<th>3-year-behind TFP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level-level</td>
<td>Δ−Δ</td>
</tr>
</tbody>
</table>

| % of innovative firms  | -                   | 0               | -               | 0               |
| % of innovative firms (innovations that account for over 10% of revenues) | - | 0 | - | 0 |
| R&D expenditures (% of revenues) | 0 | 0 | 0 | 0 | 0 |
| Skill profile (% of R&D personnel with university degree) | 0 | 0 | 0 | 0 |
| % of innovative firms that deposited patents | 0 | 0 | 0 | 0 | 0 |
| % of innovative firms that implemented advanced management techniques | - | 0 | - | 0 | - | 0 |
| % of innovative firms that implemented change in organizational structure | 0 | 0 | 0 | 0 | 0 |
| % of innovative firms that implemented new marketing strategies | 0 | 0 | 0 | 0 | 0 |
| % of innovative firms that implemented changes in products design | 0 | 0 | 0 | 0 | 0 | 0 |
Table 2A: Changes Regressions (Contemporaneous TFP and Leads)

<table>
<thead>
<tr>
<th></th>
<th>Contemporaneous</th>
<th>1-year-ahead TFP</th>
<th>3-year-ahead TFP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Δ-level</td>
<td>Δ^2-Δ</td>
<td>Δ-level</td>
</tr>
<tr>
<td>% of innovative firms</td>
<td>+</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>% of innovative firms (innovations that account for over 10% of revenues)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>R&amp;D expenditures (% of revenues)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Skill profile (% of R&amp;D personnel with university degree)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>% of innovative firms that deposited patents</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>% of innovative firms that implemented advanced management techniques</td>
<td>+</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td>% of innovative firms that implemented change in organizational structure</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>% of innovative firms that implemented new marketing strategies</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>% of innovative firms that implemented changes in products design</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 2B: Changes Regressions (TFP Lags)

<table>
<thead>
<tr>
<th></th>
<th>1-year-behind TFP</th>
<th>3-year-behind TFP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Δ-level</td>
<td>Δ^2-Δ</td>
</tr>
<tr>
<td>% of innovative firms</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>% of innovative firms (innovations that account for over 10% of revenues)</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>R&amp;D expenditures (% of revenues)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Skill profile (% of R&amp;D personnel with university degree)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>% of innovative firms that deposited patents</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>% of innovative firms that implemented advanced management techniques</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>% of innovative firms that implemented change in organizational structure</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>% of innovative firms that implemented new marketing strategies</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>% of innovative firms that implemented changes in products design</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

References


**Does What You Export Matter?**

**Interview with World Bank Senior Economist Daniel Lederman**

By Denise Marinho

Oil, gas or precious metals... Developing countries with natural resource abundance and little export diversification face the risk of having blessing turned into a plague. However, on the path to long-term development, natural resources can be associated with cursed goods only if an economy concentrates its exports on a few commodities, becoming more vulnerable to macroeconomic volatility in the marketplace, explains Daniel Lederman, World Bank Senior Economist in the Development, Trade and International Integration Research Group (DECTI).

In the paper "Does What You Export Matter? In Search of Empirical Guidance for Industrial Policies", Lederman and his colleague William Maloney, World Bank Lead Economist in LAC, explain that the main challenge for countries like Brazil is to maintain a very diversified export structure and foster a knowledge intensive production process. Here are the highlights of his interview to the Quarterly Knowledge Report.

**Brazil Economic Team:** The study refers to cursed and smart goods. Could you explain what they are?

**Daniel Lederman:** In our report, we included a chapter called “Cursed goods” and there is a long-standing academic and popular literature on the role that natural resources play in development. There is a so-called curse on natural resources that poses that countries with a high dependency for their exports on natural resources, especially mineral and energy products, tend to grow more slowly because of various reasons. What we find is that the evidence for the supposed curse on natural resources, especially mining products, is not robust.

We do believe, however, that there might be concerns about microeconomic volatility associated with mineral exports because export concentration tends to be higher in economies that depend on mineral exports.

On the other hand, smart goods are industries or products associated with higher return to skills or to schooling, meaning that skilled workers employed in the production of smart goods tend to have higher wages than unskilled workers, and that that relationship is higher when compared to other industries or products. So, it is the relationship between the wages of skilled workers and unskilled workers.

**BET:** Which criteria a middle-income country like Brazil should take into account when choosing exporting sectors to support?

**Lederman:** There are four types of criteria that one should consider. One is the level of income; another is the size of the economy or the labor force; another one is the degree of dependency on mining and energy products. The fourth could be the level of risk in the product composition of exports. In general, poor countries, smaller countries and countries that depend on mining and petroleum for energy exports tend to have a more concentrated export structure or portfolios, which are then associated with higher macroeconomic volatility.

**BET:** Which criteria a middle-income country like Brazil should take into account when choosing exporting sectors to support?

**Lederman:** There are four types of criteria that one should consider. One is the level of income; another is the size of the economy or the labor force; another one is the degree of dependency on mining and energy products. The fourth could be the level of risk in the product composition of exports. In general, poor countries, smaller countries and countries that depend on mining and petroleum for energy exports tend to have a more concentrated export structure or portfolios, which are then associated with higher macroeconomic volatility.

In those types of economies, it is useful to think about innovative ways that could help the economy diversify its exports. We would not suggest, however, particular products or industries to be subsidized.

**BET:** Focusing on high-tech exports is a good strategy to develop a country’s industry?

**Lederman:** We believe that the notion of a high technology good is a little bit misleading, because we’ve observed that countries that export the same product can have dramatically different industrial organization in the production process.

In one economy, the production and design of computers can be high-tech in the sense that the industry is focused in investing in research and development and patenting ideas, whereas in another country, the same product might be produced and exported abroad in an industrial organization characterized by an assembly operation and not by a knowledge intensive production process.

Therefore, we think it’s much safer to target the act of innovation rather than the product itself. What a government should do is stimulate the private sector’s investment in innovation – R&D or product development, upgrading managerial practices, introduction of new production methods that provide information to all companies and can be useful for commercial purposes in other industries.

**BET:** Do Latin American countries steadily invest in R&D?

**Lederman:** In a previous work from the World Bank’s Latin America region, we have benchmarked almost every major economy in terms of their intensity of investment in R&D. Without exception, we believe that most countries in Latin America are lagging behind global standards, even after controlling for the in-
But as the country begins to exploit and produce more mineral products, including energy products, it is likely that its export structure will become more concentrated. The challenge is developing a knowledge economy out of a mineral rich economy, that’s why we do believe there’s a rational justification for the public sector to be proactive in the innovation and technology agenda, because the private sector by itself might not make the optimal levels of investment from the point of view of the country as a whole.

BET: How to ensure that industrial policies are not captured by powerful interests?

Lederman: There is no cookie-cutter solution to these institutional challenges. Surely, it requires a political leadership to prevent the establishment of an overly close relationship between the private sector and the Government. But institutional mechanisms can also be set up. For example, suppose that a Government wants to subsidize private investments in R&D or in product development across a wide set of industries. That policy would be unlikely to be captured by one interest, because it would be focused on all possible products and sectors that entrepreneurs can think of.

So just having programs that are focused on diversification of innovation rather than on a sector already helps counterbalance possible interest groups. Second, one can establish mechanisms where the public funding for private sector investment in innovation across a broad set of industries is not 100 percent of the investment. These would be matching grant programs, where the Government receives proposals for innovative investments and it creates a commission to blindly evaluate each individual proposal and then runs them by the potential value in business, from the point of view of society, funding 50 percent of the investment. The private sector really needs to be committed to that idea.

BET: Brazil has a long history of IPs and is considering changes. How would you assess the country’s record and options in the area?

Lederman: Embrapa, for instance, has a good record. The international literature shows that the ratio of return for R&D and knowledge diffusion in agriculture tends to have very high rates of return, which also dispels the notion that innovation is only a phenomenon that occurs in manufacturing industries. However, one of the reasons why it is so difficult to have a very rigorous impact evaluation of the Brazilian industrial policy system as a whole is because there are so many players.

In Brazil, we have all the ministries, BNDES, Embrapa, universities, the state governments and their own agencies as players. So to do a systemic evaluation becomes almost impossible because we cannot disentangle the effects of the different programs and how they end up affecting the outcomes in the marketplace. We look forward to strike a dialogue with the capable staff in the ministries and the regional State governments to make an assessment of their system in a qualitative way and also to understand how to design new and innovative programs such as matching grant programs, in a way that we can also evaluate them overtime and have rigorous and credible impact evaluation data that can help improve results and impact. It is very important to design these policies in a way that they can be evaluated.
How Many More Jobs Will Better Access to Foreign Markets Bring?

By Abdoulaye Sy and Barbara Farinelli

Over the last decade, Brazil’s access to foreign markets improved considerably. In 1998 the average manufacturing industry in Brazil exported to 87 countries, by 2009 this reached 132 countries1. However, there are large differences in access to foreign markets across export industries and, more importantly, within export industries over time (Figure 1). Changes in the number of export destinations within an industry reflect evolutions in the competitiveness of that industry or industry-specific supply and demand shocks. Such shocks may result from changes in world demand for goods and services of an industry or the differential impact of domestic and international macroeconomic fluctuations across industries. Given recent periods of large volatility in world economic activity, it is important to understand how these fluctuations may have affected Brazilian export industries through a reduction in the number of countries they export to. In this note we analyze how changes in access to foreign markets affect employment and wages in different export industries.

Before turning to the detailed description of the analysis, we summarize our main findings. Our results show that changes in export competitiveness had different effects on Brazil’s export industries. We find that differences in the number of export destinations explain the relative expansion of some sectors as measured by their share in total employment (Textile, Apparel and Leather, Wood Products, Paper and Publishing and Manufacturing of Machinery and Equipment industries) while other sectors contracted (e.g. Mining, Food; Beverages and Tobacco, Wood Products and Manufacturing and Assembling of Motor Vehicles). Our analysis implies that differences in access to foreign markets explain a great deal of the evolution in industry structure in Brazil during 1998-2009. We also find that while improved access to foreign markets led to similar increases in employment levels of high-skill and low-skill workers, it widened the labor earning gap between high-skill and low-skill workers.

As recent evidence shows, access to foreign markets leads firms to export, innovate and invest in productivity-enhancing technologies2. This suggests that a larger market size will raise productivity of firms, their demand for labor and market equilibrium wages. We define access to foreign markets as the number of destinations (countries) a particular industry exports to3. Pooling different rounds of the PNAD we compute employment and average monthly labor earnings for the 26 two-digit export industries in Brazil during 1998-2009.4

Our first set of results is displayed in Table 1 (next page), where each row corresponds to a different regression. Column (1) shows the results where the dependent variable is the logarithm of employment, and row 1 shows results pooling all industries. The point estimate in column 1 and row 1 is .06 and is precisely estimated. This result suggests that an additional export destination raises industry employment by 6 per cent or about 58,000 new jobs. Row 2 to 8 repeats this analysis for seven groups of industries. All point estimates are of the same magnitude and are significant except for two industry groups (Manufacturing and Assembly of Motor Vehicles).

An important question is whether some industries are likely to grow or shrink due to differences in access to foreign markets changes. To respond to this question we compute simple estimates of the change in employment resulting from differences in export destinations across industries. We then examine and discuss the implication of these estimates in terms of different industry’s relative ex-

---

1. The composition of export destinations changed slightly during this period. The share of high income export destinations (resp. middle income and low income) went from 45 percent in 1998 to 38 percent in 2009 (resp. from 30 percent to 25 percent for middle income export destinations, and from 20 to 24 percent for middle income export destinations).


3. All regressions are weighted by the total value of trade to account for the fact that some export destinations are large and have a higher share of total export.

4. We use a fixed effect model to estimate the model (including both an industry fixed effect and a year fixed effect). We also estimated models using the exchange rate as an instrument for the number of export destinations (the results were similar). Standard errors are clustered at the two-digit industry level.
pansion and contraction as measured by their share in total employment. We implement this analysis as follows. For each of the 26 export industries, we estimate the change in the logarithm of employment between 1998 and 2009 as the product between the marginal effects reported in column (1) and the increase in the number of export destinations during the same period. We then aggregate these estimates across all industries (row 1) and across the seven broad industry groups (row 2 to 8). In column (3) we report the actual change in the logarithm of employment and in column (4) we show the ratio between the estimates and the data. The results show that our model explains a great deal of the pattern of relative expansion and contraction of industries as measured by their share in total employment. In particular, our model explains 8 to 21 percent of the expansion of the Machinery and Equipment; Textile; Apparel and Leather and Wood Products, Paper and Publishing industries. For industries that contracted in relative terms, our model also explains a significant amount of the evolution, except for the Machinery and Equipment industry.

The results presented above suggest Brazil’s improved access to foreign markets is accompanied by significant changes in the relative size of different export industries in Brazil. Which workers are more likely to gain from these changes? Do these changes affect inequality in earnings? With these questions in mind we analyze how changes in the number of export destinations affect industry level demand for high-skill and low-skill workers and their labor earnings. The results from this analysis are reported in Table 2. Column 1 shows that an additional export destination raises overall employment by 6.9 percent and labor earnings by 1.8 percent. We find that this leads to similar increases in the employment of high-skill and low-skill workers and no change in the skill mix of industries (ratio of high-skill to low-skill workers). However, while the earnings of high-skill workers increase by 2.4 percent for each additional export destination, the earnings of low-skill workers remain unchanged, which leads to a 2.1 percent increase in the earnings difference between high-skill and low-skill workers.

The results from our analysis suggest that higher skilled workers are more likely to reap the benefits of improved performance of Brazilian export industries. The evidence points to the fact that educational policies and programs that promote human capital accumulation and skill upgrading will not only increase productivity in Brazilian firms but also respond to rising demand for skills.

---

5. We have experimented using both unweighted and weighted means using as weights an industry’s share of total employment in 1998. The results remained overall very similar.

6. We define high-skill and low-skill workers using the distribution of monthly labor income. High-skill (resp. low-skill) workers are defined as those workers earning above (resp. below) the median monthly labor income in a the industry where they work for a given year.

7. Each row and column correspond to a different regression.
Brazil’s Missing Middle

By Makhtar Diop

Folha de S. Paulo (Sunday, January 2)

The best translation for the “missing middle” is Brazil’s own middle class – having grown substantially, its full potential is yet to be tapped.

A few days ago, a front page article in [Brazilian newspaper] Folha de S. Paulo noted that the “C” class is already buying more household electrical appliances than the “A” and “B” classes, a situation that marks an important inflection point for Brazil, particularly at a time when the country is actively looking to a future of growth and development.

In many respects, President Dilma Rousseff will face a development landscape that is starkly different from her predecessors.

Over the past two decades, Brazil managed to overcome many of its most basic social and economic challenges. It achieved universal basic education, strengthened the fiscal base needed for growth, investment, and job creation, and lifted tens of millions of people out of poverty.

These are remarkable feats. However, paradoxically, the sheer scope of these achievements makes the road ahead more difficult. An analogy can be made with a building – the higher up you go, the more difficult it becomes to build the next floor, and the more important the foundations become.

Brazil will now face new challenges in the areas of fully eliminating poverty, providing opportunities for all children, and expanding infrastructure in a sustainable and planned manner. These challenges call for ongoing institution building and the strengthening of private investment capacity. In this regard, the country is rising to the challenge.

At the same time, however, while the enormous social and economic gains made in recent years have largely benefited the poor, they have not yet managed to eliminate Brazil’s fundamental inequalities between north and south and between the poor outskirts and the wealthy neighborhoods of the big cities. The income disparity between the wealthiest 10 percent and the poorest 10 percent remains vast – on the order of 4,400 percent.

Consequently, Folha’s headline serves to underscore both the intractable nature of these challenges and the progress being made, a situation that reflects Brazil’s “missing middles” – gaps between two extremes. Brazil will have to tackle these distortions, which pose a threat to the country’s potential.

Now that basic education is being provided to virtually all children, secondary education access and quality are beginning to loom large in the context of Brazil’s competitiveness.

The obvious gap between basic and university education is stifling opportunities for millions of young people. Similarly, while Brazil has developed a highly productive private sector, there is virtually no upward movement of small and medium enterprises to allow for competition with big businesses. The former are unable to boost productivity and gain access to financing. Many promising initiatives end up falling by the wayside.

The best illustration for the lack of those “middles” is the middle class itself. While its ranks have grown substantially, its full potential is yet to be developed, owing in large measure to the services to which it lacks access.

As Brazil continues to lift individuals out of poverty, it needs to redouble its efforts to create the institutions and opportunities to the new middle class in areas that transcend income. Viewed from this angle, the country’s divide between rich and poor remains firmly in place.

Brazil has succeeded in combining economic and social progress, making domestic demand and poverty reduction the drivers of the country’s growth.

This is an essentially homegrown agenda, and represents another step on the road to becoming a developed country. Addressing the variety of “missing middles” will be an effective way to overcome new challenges and ensure that new opportunities are within everyone’s reach.

Our hope is that the “class C” will continue to buy more household appliances, cars, houses, education, and health care for their children, and that this becomes the norm and does not justify headlines any more.
Editorial
(continued from page 1)

highlights another important aspect of generating relevant knowledge for a MIC: the need to bring it back to the benefit of the whole Bank. This goes beyond the knowledge itself, to include the means by which it was generated and made useful to the client.

The Bank has a comparative advantage in embodying and sharing lessons of international experience, and is also in a unique position to be the central hub for South-South exchanges. But to be effective in both, especially in a decentralized structure, it is imperative to incentive the flow back of ideas to Washington.

This is what we tried to do in the First Brazil Knowledge Day.

With it, we hoped to contribute to the leveraging of knowledge work in other MICs, so that the Brazil event was really about much more than just one country. Chairs and commentators at the event, from outside the Bank and across its sectors, were unanimous that these two dimensions – the knowledge generated in the Brazil context, and the strategy and processes behind this generation – are very useful for the institution as a whole, and consequently to our clients.

I hope you enjoy Mauro Azeredo’s reporting on this important event, and also the rich selection of analytical pieces in this edition: from Romero Rocha’s counter intuitive results on closing the wage gap and Barbara Bruns’ deep analysis of Brazil’s education sector, to Abdoulaye Sy’s and Barbara Farinelli’s linking of export markets to total factor productivity and Guilherme Lichand’s dense analysis of state TFP dynamics. Denise Marinho’s excellent interviews with Governor Antonio Anastasia, the man behind Minas Gerais’ famous Choque de Gestão, and Daniel Lederman, on the challenges of an effective industrial strategy in Brazil, top this edition.

Enjoy your reading.

Makhtar Diop
Brazil Country Director

In the Loop
Some of the quarter’s noteworthy events

Events
- Brazil Disaster Risk Management High Level Workshop with Cities Minister—April 11, Brasilia
- Becoming Old in an Older Brazil, seminar and report launch with BNDES President Luciano Coutinho—April 6, Rio de Janeiro
- Bloomberg Brazil Economic Summit, Makhtar Diop presentation—March 29, São Paulo
- Brazil BBL: “Does What you Export Matter?” with Daniel Lederman—March 2, Brasilia
- Brazil BBL: “Trade Liberalization, Firm Heterogeneity and Wages” with Pravin Krishna—February 28, Brasilia
- Land Use Low Carbon Seminar with Embrapa—February 21, Brasilia
- Transport Low Carbon Seminars—February 17-18, São Paulo and Brasilia
- Brazil BBL: “Eradicating Extreme Poverty” with Serguei Soares—February 1, Brasilia
- Brazil BBL: “Using IBGE Censuses Through MySQL” with Daniel Simplicio and Guilherme Lichand—January 19, Brasilia
- Press launch of the Brazil Education Report with Education Minister—December 13, Brasilia
- Brazil BBL: “Treasury Briefing” with Miguel Navarro-Martin—November 24, Brasilia

Projects Approved
- Rio de Janeiro Metropolitan Urban and Housing Project—$ 485 million, March 15—Project will benefit 2 million poor people who live in informal low income settlements in Rio de Janeiro. The financing, a request of President Dilma Rousseff, follows the record January flooding that killed over 900 in the State.
- Federal University Hospital Modernization Project—$ 150 million, March 31—will support modernizing management and infrastructure of 46 federal university hospitals throughout Brazil, helping to improve the quality of services delivered to millions of people in the country.
- Waste Picker Inclusion Initiative—$ 2.7 million Japan Social Development Fund Grant, associated with the IBRD Integrated Solid Waste Management and Carbon Finance Project, January 28—first phase will benefit approximately 5,000 people who depend on the informal recycling of solid waste in urban landfills.