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Globalization and Formal Sector Migration in Brazil

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Abstract

We use novel linked employer–employee data to study the relationship between globalization and formal sector interstate migration for Brazil. We estimate the worker's multichoice migration problem and document that previously unobserved employer covariates are significant predictors associated with migration flows. Our results provide support for the idea that globalization acts on internal migration through the growth of employment opportunities at locations with a high concentration of foreign owned establishments and the stability of employment at exporting establishments. A 1 per cent increase in the concentration of foreign owned establishments at potential migration destinations is associated with a 0.2 percentage point increase in the migration rate, and a 1 per cent increase in exporter employment predicts a 0.2 percentage point reduced probability of migration.

Keywords: migration, globalization, policy reforms, Brazil

JEL classification: R23, O15, J61

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1 Introduction

When economies adjust to globalization, local resources shift. Workers change jobs and internal migration flows ensue, depending on the degree of individual mobility. We study the association between international economic integration and domestic migration using novel data that comprehensively track individual workers and their employers over time in Brazil, a leading developing country. Brazil underwent salient efforts to integrate its economy globally, and simultaneously experienced an acceleration in domestic migration.

Brazil has a long history of high rates of internal migration, similar to many developing countries. Over the past century, massive flows of internal migrants left states in the North and Northeast for the growing urban centres in the Southeast and for Brasília (Library of Congress 1998). Migration has not subsided. To the contrary, estimates of lifetime interstate migration rates grew from 20 per cent of the population in 1980 (Martine 1990) to 40 per cent of the population in 1999 (Fiess and Verner 2002). This migration surge coincides with market-oriented reforms and Brazil's progressing integration into the global economy since the late 1980s. Brazil implemented major trade reforms in the early 1990s, trade integration with its Southern Cone neighbors in 1993, gradual foreign direct investment liberalizations over the 1990s, and an exchange-rate devaluation in 1999 that facilitated foreign market access for exporters. The total stock of foreign direct investment (FDI) in Brazil, for instance, stood at US$115.5 billion in 1995. Within five years, this stock more than quintupled following Brazil's trade and capital-account liberalizations and macroeconomic stabilization (Rodrigues 2000). Most foreign investments flowed to newly privatized utilities and services companies so that industries beyond manufacturing were impacted.

We document recent migration patterns across states in Brazil using novel and, in their scope, internationally unprecedented linked employer-employee data for a developing country. The data show that one third of the job-changing workers in Brazil's formal sector migrate across state borders to find new formal employment every year in the 1990s. Contrary to long term evidence from household cross-sections, we show that recent annual migration flows of formal sector workers are directed towards uncommon destinations. Select states in the Centre-West, North and Northeast receive large flows of formal sector immigrants. This

stands in contrast to the assertion that the typical migrant flow in Brazil runs from North to South.

Our data link workers to their employers and are uniquely suited to investigate to what extent factors related to globalization are associated with observed migration flows. There is a robust association between globalization-related employer characteristics and formal sector migration across states. While the majority of workers move between domestic and non-exporting establishments, there are notable differences between migrants and stayers in their exposure to foreign owned and exporting establishments. The average migrant in the sample is more likely to move to a job at a foreign owned or exporting establishment than a non-migrant. Job changers to foreign owned establishments benefit from a considerably steeper tenure-wage profile than workers at domestic-owned establishments.

We further investigate these mean sample characteristics in a multivariate analysis that incorporates the methodology proposed by Dahl (2002) to account for the many destination choices that a migrant faces. The descriptive results provide additional support for the idea that globalization acts on internal migration through the growth of employment opportunities at locations with a high concentration of foreign owned establishments and the stability of employment at exporting establishments. The importance of the presence of foreign owned establishments in the immigration region, beyond the spot wage, is consistent with the economic rationale that migrants can expect benefits beyond the spot wage difference, such as steeper wage paths at foreign owned establishments or more favourable overall labour-market conditions.

The remainder of this chapter is organized as follows. In the next section, we summarize the literature on internal migration and discuss recent market-oriented policy reforms in Brazil. Section 3 describes the data and offers descriptive statistics relating globalization and cross-state migration in Brazil. Section 4 offers multivariate support for the descriptive evidence. We introduce the statistical model of the migration decision, paying special attention to self-selection of migrants, and present estimation results alongside. We conclude with final remarks.

Table 1: Average regional characteristics, 1997-2001

	GDP per capita	Population (millions)	Share of value added in			Urbani-zation
			Agriculture	Manufact.	Services	
North	2,667	1.9	0.106	0.260	0.634	0.004
Northeast	2,111	5.4	0.094	0.345	0.561	0.031
Southeast	7,507	18.3	0.054	0.416	0.529	0.094
South	6,762	8.5	0.139	0.428	0.433	0.130
Centre-West	7,464	3.0	0.188	0.206	0.606	0.009
Average	4,364	6.4	0.110	0.322	0.568	0.041

Source: IBGE, 1997-2001.

2 Internal migration and policy reforms

Considerable economic disparities persist between Brazil's five regions. As Table 1 shows, per capita GDP in the Southern regions (South and Southeast) is more than triple the per capita GDP level in the Northern regions (North and Northeast).[1] Even within regions, incomes between Brazil's 27 states differ. These regional disparities offer incentives for migration. Brazil's population in 2001 was approximately 176 million, with around half (85 million) actively participating in the labour force (World Bank 2005). The International Labour Organization estimates that 66 per cent of the labour force held a formal sector job in 1997 (Meier and Rauch 2005). Our data cover the formal sector.

2.1 Internal migration

Historically, migrants in Brazil moved to cities where import-substituting industries flourished and away from the rural interior that underwent agricultural modernization (Martine 1990). Declining agricultural prices contributed to rural displacement, and migration to the coastal cities accompanied Brazil's industrialization process and urban growth (Yap 1976, Graham 1970). The combination of rising wages in the industrial South and declining wages in the rural North accelerated the flight from rural areas over the decades. Using data from the Brazilian decennial censuses, Martine (1990) reports that the number

[1]The high average GDP per capita in the Centre-West region is misleading, as the capital city in the Distrito Federal (DF) largely drives the results (the median per capita GDP for the region is only $5,925). Per capita GDP in the Distrito Federal is the highest in the country (US$13,604), compared to only US$4,403 in the neighboting state of Goias (GO).

of Brazilians residing in a state other than the state of birth was 3.5 million in 1940 (or 9 per cent of the population). This share increases steadily until 1980, when close to 20 per cent of the population reside outside their state of birth.[2] Migration accelerates further during the last two decades of the 20th century and results in a doubling of the migrant population share (with the primary residence outside the birth state) to 40 per cent by 1999 (Fiess and Verner 2002).

Research into determinants of internal migration can be classified into two broad categories: research that concentrates on migrant characteristics, and research that concentrates on regional characteristics and differentials as primary determinants. Early studies on Brazil, such as Sahota (1968), Graham (1970) and Yap (1976), related internal migration to regional and sectoral wage and income differences. In a recent study, Fiess and Verner (2002) place primary attention on migrant and stayer characteristics. Fiess and Verner find that migrants from the Northeast to the Southeast face strong economic incentives for migration, while migrants from the Southeast region to the Northeast region confront lower estimated returns to migration, suggesting other non-pecuniary factors may play a relatively larger role.

Lacking information on employer-level, or municipality-level, exposure to international markets, prior research largely neglects the role of market-oriented reforms and globalization for internal migration flows. The main purpose of this chapter is to uncover the relationship between formal sector migration and economic reform, as promoted through Brazil's trade, investment and macroeconomic policy shifts. We control for wage differentials and self-selection of migrants, using a one per cent random sample of the national workforce, and identify the workers' annual state-to-state migrations between 1997 and 2001. While much of the previous work identifies single migration decisions from a cross section of workers, drawing on decennial censuses or household surveys, the depth of our novel matched employer-employee data set allows us to identify worker mobility at the annual horizon and to incorporate employer-level information on exposure to global markets. Contrary to worker cross sections, where worker characteristics are typically only measured at a single time

[2]Graham (1970), Martine (1990) and Schmertmann (1992) provide a detailed history of the Brazilian migration experience.

after migration, we can draw on worker, employer, and location information before and after migration. Lacking information on informal workers, however, our results can only represent migration flows within the formal sector.

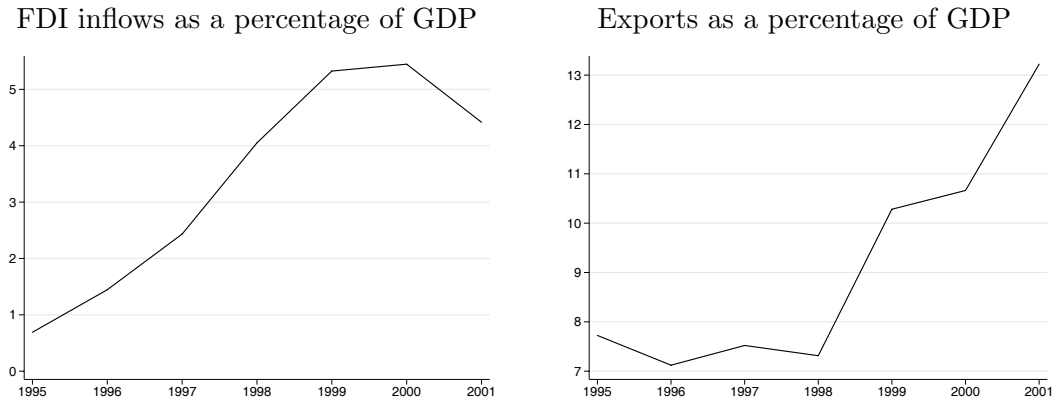
Prior research shows that chief among the migration determinants are migrant characteristics such as age, sex, educational attainment, as well as regional characteristics like per capita income differentials and urbanization rates. Beyond those covariates, we include factors related to globalization at the migrant level—employment in a multinational enterprise and employment in an exporting establishment—and control for state-level information on the share of foreign owned and exporting establishments as factors in the migration decision. Our data do not include family variables like marital status or the number of children, however, which prior research has shown to be associated with migration. Inasmuch as family variables are related to prior workforce experience, which we observe at the individual level, we can control for their impact on migration selection.

2.2 Brazil's policy reforms

Brazil offers a particularly appropriate setting to study the association between globalization and internal formal sector migration because salient liberalizing policy reforms occurred over a short period of time. The marked time variation, and differential regional responses to Brazil's large-scale national reforms, allow us to discern the effects of globalization on internal migration from other simultaneous but more gradual economic changes. Figure 1 illustrates the considerable increases in FDI inflows and exports as a percentage of GDP for the Brazilian economy between 1995 and 2001 (World Bank 2005). These notable changes followed trade liberalization and macroeconomic stabilization policies, which helped bring down inflation levels and opened the Brazilian market to international competition.

Average tariff rates fell from 41 per cent to 18 per cent between 1988 and 1989. In the early 1990s, Brazil abolished the remaining non-tariff barriers inherited from the import substitution industrialization era (Averbug 2000), brought nominal tariffs further down to below 15 per cent, and formed the free trade area Mercosul with its Southern Cone neighbots Argentina, Paraguay and Uruguay. Brazil's entry into Mercosul in 1991 was instrumental in attracting inflows of FDI to the country as a regional export base for multinational

Figure 1: Foreign direct investment inflows and exports, 1990-2001



Source: World Bank, 2005.

firms (Pineiro and Moreira 2000). After decades of inflation and several unsuccessful stabilization attempts, the Brazilian government succeeded with its fierce macroeconomic stabilization plan *Plano Real* in 1994 and lastingly ended hyperinflation. These reforms put Brazil's economy on a pro-competitive basis and precede our sample period 1996-2001. It is mainly during the second half of the 1990s that the Brazilian economy exhibits heightened capital inflows and exporting activity (Figure 1). We hypothesize that Brazil's progressing integration into the global economy is related to domestic factor reallocations, which in turn should be associated with formal sector migration flows.

3 Data sources and descriptive statistics

Our main data source are Brazil's administrative records of formal sector workers and their employers. We combine this worker information with complementary data sources on foreign and exporting establishments, industries, and state-level characteristics.

3.1 Worker data

The linked employer-employee data come from the Brazilian Labour Ministry (*Ministério do Trabalho e Emprego*) Brazilian Labour Ministry (1996-2001). By law, all registered establishments are required to report to the ministry on their workers every year. In practice, only formally-employed workers will be properly reported. This information is collected in

the data base *Relação Anual de Informações Sociais* (RAIS) since 1986. For most of our analysis, we use information from RAIS for the years 1997 through 2001 when we also have complementary information. RAIS includes the worker ID (*Programa de Integração* PIS), similar to a social security number in the United States. Also included in the data are the tax number of the worker's establishment (*Cadastro Nacional de Pessoa Jurídica* CNPJ), the industrial classification of the worker's establishment (*Classificação Nacional de Atividades Econômicas* CNAE) and the municipality of the worker's establishment.[3]

The main benefit of the RAIS database is the ability to track individually identifiable workers over time, across establishments, and across municipalities and states. Brazilian establishment tax numbers are common across many databases so that RAIS information can be combined with complementary establishment-level data sources. The RAIS worker data offer information on annual real wages, tenure at the establishment, gender, age, and educational attainment.[4] RAIS covers establishments in any sector, so workers in the services and utilities industries, to which much of the foreign investments were directed in the second half of the 1990s, are included.

We draw a one per cent random sample of the national data and restrict observations as follows. First, only workers with correct eleven-digit worker IDs are included.[5] Following Abowd, Kramarz, and Margolis (1999), we restrict the set of workers to only those workers receiving positive wages. Finally, for workers with multiple jobs in a given year, only the most recent job is included in the sample. If a worker has multiple current jobs, the highest paying job is included in the sample. This restriction rests on the assumption that workers most likely rely on the last and highest-paying job of the year in their decision to migrate.

[3]A worker's ID generally remains with the worker throughout his or her work history. The process for establishments to report on their workers is extensive and costly. However, RAIS records are used to administer payment of the annual public wage supplements to every formally-employed worker, thus creating a strong incentive for workers to urge their employers to report accurately.

[4]Educational attainment is defined as the level of schooling completed.

[5]Eleven digits is the traditional length of a PIS number in Brazil. Shorter PIS numbers are defective and not trackable over time. Firms that enter false identification numbers could be reporting informal workers, or have faulty bookkeeping.

3.2 Complementary establishment and state data

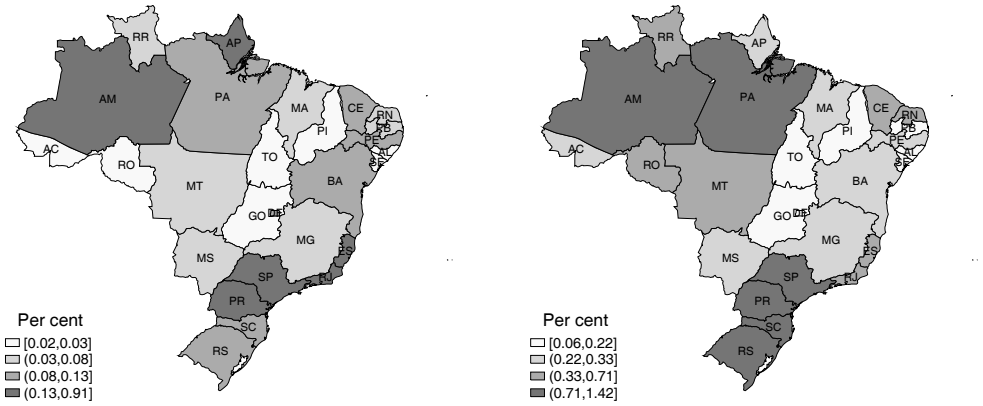
By law, all foreign investments are registered with Brazil's central bank (*Banco Central do Brasil*, BCB) in its *Registro Declaratório Eletrônico–Investimentos Externos Diretos* (RDE-IED) (Brazilian Central Bank 1996-2001). The RDE-IED is available from the BCB for the years 1997 through 2001. We define an establishment to be (partly) foreign owned in year t if the establishment received an inflow of foreign capital in year t. We note that establishments receiving inflows of foreign capital in year t may maintain foreign relationships in later years. Therefore, establishments are counted as foreign owned in all years $\tau \geq t$ after the initially observed inflow at year t.[6] Finally, we consider foreign funds at the holding-company level to affect all establishments of the corporate group. Using BCB information on the corporate ownership relations among Brazilian firms, we therefore also count an establishment as foreign owned in year $\tau \geq t$ if it is a subsidiary of a company receiving inflows of foreign capital in year t. Matching the RDE-IED information to RAIS at the establishment level, we define an indicator variable equal to one iff a worker holds a job at a foreign owned establishment. We also compute the share of foreign owned establishments at the state level.

We use exporter status data from the Brazilian customs office (*Secretaria de Comércio Exterior*, SECEX) (Brazilian Customs Office 1996-2001). SECEX maintains an establishment-level data set consisting of all legally-registered exporting establishments in Brazil with at least one export transaction in a given year. We match SECEX information from 1997 through 2001 to RAIS and define an indicator variable equal to one iff a worker holds a job at an establishment with a positive dollar value of free-on-board exports in a given year. We also compute the share of exporting establishments at the state level.

Figure 2 shows average shares of foreign owned establishments and of exporting establishments by state between 1997 and 2001, with darker shades reflecting higher shares. Amazonas (AM), in the North, has the highest share of foreign investments, as defined by

[6] We may miss (partly) foreign owned establishments if there was an initial inflow of foreign capital before our sample period, and no inflow during our sample period. Note, however, that retained earnings are inflows under common foreign direct investment definitions so that inflows are likely to be observed in every year of foreign ownership. Missing some (partly) foreign owned establishments moves the odds of detecting a statistically significant effect of foreign ownership against us.

Figure 2: Global integration of Brazilian states, 1997-2001
Shares of foreign owned establishments Shares of exporting establishments



Sources: RDE-IED and SECEX, 1997-2001.

the share of foreign owned establishments in the state during the five year period from 1997 to 2001. This is likely a consequence of Brazil's exports promotion programs and export processing zones in the Amazon. São Paulo (SP) and Rio de Janeiro (RJ) states rank second and third, respectively. The Northeastern states of Tocantins (TO), Sergipe (SE), and Acre (AC) are the locations with the smallest shares of foreign ownership. The Amazon also ranks the highest in terms of exporting establishments to total establishments. The state of Pará (PA), also in the North, has the second highest share of exporting establishments. Otherwise, exporting establishments are largely concentrated in the Southern regions.

We obtain state-level information on population, GDP per capita, urbanization rates, and value added in agriculture, manufacturing, and services from the Brazilian census bureau (*Instituto Brasileiro de Geografia e Estatística* (IBGE); see Table 1) Brazilian Census Bureau (2005). These variables are traditionally reported among the key determinants of the migration decision.

3.3 Complementary trade data

To reflect a Brazilian industry's lagged exposure to global competition, we obtain export and import information from WTF (*World Trade Flow*) data for the years 1996-2000 (Feenstra, Lipsey, Deng, Ma, and Mo 2005); we extract sector-level trade flow statistics by *SITC Rev.*

2 4-digit product category in current US$ for Brazil's exports and imports, and map the trade-flow information to the 2-digit *CNAE* sector level in RAIS (broadly comparable to the *SITC* 2-digit level). We then use a state's industry composition from RAIS to calculate last period's location-specific exposure to foreign trade.

3.4 Migrant and stayer characteristics

The complete linked employer-employee database includes the full employment history of formal sector workers in Brazil from 1997 through 2001. We define workers as *migrants* if the state of the worker's establishment at time t is different from the state of the worker's establishment at time $t+1$. Conversely, if a worker remains in the same state for years t and $t+1$, he is considered a *stayer* but may switch employers within the same state.

The final one per cent random sample includes 1,548,131 workers in 339,515 establishments over the period 1997 through 2001. We use the 1,005,010 individuals who appear in the data for at least two consecutive time periods to calculate annual migration statistics. The workers are from any of the 27 states and any sector of the economy. Migrants represent around 2 per cent of the complete sample (22,837 individuals) in the annual average. Formal sector migrants are most often from the Centre-West and Northern regions, where 3.9 per cent and 3.0 per cent of workers are migrants, respectively, while workers in the Southeastern region are least likely to move between states (2.0 per cent of workers migrate). As a consequence of annual migration rates around two per cent on average, small differences in employment patterns may have a potentially strong impact on migration patterns.

Small annual migration rates can nevertheless be associated with considerable migration backgrounds in a cross section of households and workers. Suppose a worker's migration odds are independent of past migration and that a worker migrates only after he has earned 40 years labour force experience. Then an annual migration rate of 2 per cent among formal sector workers will result in a share of 55 per cent of workers with a migration background among the cohort just before retirement ($1-.98^{40}$), and a 33 per cent migration background for a worker half-way through the active time in the labour force ($1-.98^{20}$). Little is known about the odds of repeat migration, and little is known about annual migration rates among workers outside the formal sector. Yet the notable share of Brazil's population with

Table 2: Average worker characteristics, 1997-2001

	Full Sample	Migrants	Stayers
Worker characteristics			
Primary school	0.563	0.587	0.563
High school	0.303	0.280	0.304
Some college	0.033	0.039	0.033
College graduate	0.101	0.094	0.101
Female	0.372	0.210	0.376
Time-variant characteristics			
Age in year t	34.0	31.5	34.1
Log average wages in t	8.08	8.18	8.08
Log average wages in $t+1$	8.14	8.19	8.13
Employed in foreign establishment in year t	0.022	0.039	0.022
Employed in foreign establishment in year $t+1$	0.028	0.052	0.027
Employed in exporting establishment in year t	0.085	0.081	0.085
Employed in exporting establishment in year $t+1$	0.086	0.080	0.086
Number of observations	1,005,010	22,837	982,173

Note: Worker characteristics in the upper panel are largely time invariant except for infrequent advances in educational attainment after entry into the formal sector labour force.
Sources: RAIS (one per cent random sample), RDE-IED, and SECEX, 1997-2001.

a cross-state migration background—around 40 per cent by the late 1990s (Fiess and Verner 2002)— suggests that the annual formal sector migration rate of around 2 per cent is perhaps similar to overall migration rates.

Table 2 contrasts average worker characteristics of migrants and stayers between 1997 and 2001. Though migrants and stayers in our formal sector sample are remarkably similar, there are a few key differences. Formal sector migrants are less likely to have a high school degree and more likely to have only a primary school education than stayers. Meanwhile, migrants are equally likely to have at least some college education as non-migrants. This highlights an important difference between our data on formal sector migration and conventional statistics on rural-to-urban migration in developing countries. Formal sector migration is relatively higher-skilled migration. Over 6 per cent of formal sector workers with at least some college education migrate across state lines at least once during the sample period. In contrast, just 2.4 per cent of formal sector workers with a high school degree migrated during the five year period and 2.8 per cent of workers with only a primary school education are migrants.

This pattern exhibits only some regional variation across emigrant region. In any region

except for the South, workers with at least some college education are more likely than workers with lower levels of education to migrate; only in the South are workers with at least some college and workers with a primary or high school education equally likely to migrate. Formal sector migrants of all education levels are most likely to migrate from the Centre-West region, consistent with the high total emigration from this state. At the state level within regions, there is some variability. Workers with only a primary school education, for instance, are more likely than the highest skilled workers to migrate out of the Northern states of Roraima and Tocantins, the Northeastern states of Alagoas (AL), Bahia (BA), Sergipe, and Maranhão (MA), and Rio Grande do Norte (RN), and the Centre-West state, Mato Grosso (MT). Workers of all levels of education are equally likely to leave São Paulo state.

Migrant demographics vary across immigrant states. While migrating workers who arrive in the Southeast and the Distrito Federal are more likely to be high-skilled, formal sector workers migrating to the North are more likely to have only a primary school education. The main exception is the state of the Amazon. Our data indicate that the share of high-skilled formal sector migrants to the Amazon is greater than the share of low-skilled formal sector migrants. These high-skilled migrants most frequently travel from within the Northern region.

Women are less likely to be formal sector migrants. This observation is consistent across all states and regions. The rates of migration for men and women are most similar in the Southern region. The average migrant is approximately two years younger than the average stayer. Youth aged 15-17 are least likely to migrate, while young workers (18-24 years) are most likely to migrate.

Wages for formal sector migrants, both before and after the migration decision, are higher than wages for stayers. Before the migration decision, the average migrant earns average annual wages approximately 10 per cent higher than stayers. The wage differential falls to 6 per cent after the migration decision. Migration theory based on neoclassical human capital theory posits that workers search for jobs that offer the highest economic return in expected future wages. If the expected wage differential is a main determinant of the migration decision, the drop in the wage differential suggests that expectedly steeper or more certain

future wage paths could be important factors for the migration decision beyond the spot wage differential.

3.5 Job changes and migration

Nationwide, between forty per cent and half of all formal sector workers change jobs per year, as Table 3 shows. In metropolitan areas, however, turnover is considerably smaller than the nationwide average, with only around one in four metropolitan workers changing jobs. Transfers of workers within firms but across states are only a minor component of formal sector migration. Migration is a remarkably important choice for workers with formal sector job changes (who neither retire nor exit the formal sector). Nationwide, roughly two thirds of the job-changing workers switch employment within state (the proportion of the same-state job changers in all job changers), but one third migrate across state borders.[7] There is a slightly less than one-half chance that cross-border job changers move to a metropolitan area. Two to three in five workers with a job loss exit the formal sector at the annual horizon. Menezes-Filho and Muendler (2007) analyze this type of transition using household data. The focus of the present chapter lies on the migrants with a successful reallocation.

Table 4 tracks the 206,418 workers in our sample who changed jobs over a year between types of establishments—domestic or foreign owned establishments and non-exporting or exporting establishments—and offers a more manifest indication that globalization may be related to internal migration. The overall odds for a worker at a domestic establishment to change to a multinational enterprise ($0.026/0.954 = 0.027$) are almost ten times smaller than for a multinational worker to change to another foreign owned establishment ($0.004/0.016 = 0.250$). Similarly, the odds for a worker at a non-exporting establishment to change to an exporter ($0.047/0.874 = 0.054$) are almost ten times smaller than for a worker at an exporter to change to another exporter ($0.026/0.053 = 0.491$).

As a consequence, the bulk of workers move between domestic and non-exporting establishments. But there are notable differences between migrants and stayers in their

[7]The fact that one third of formal sector job switchers are cross-state migrants is of particular importance to the conduct of repeated household surveys, which invariably classify these households as missing and thus potentially exaggerate transitions into unemployment.

Table 3: Job retentions and changes, 1997-2001

	National					Metropolitan areas				
	1997	1998	1999	2000	2001	1997	1998	1999	2000	2001
Job retention										
Same location	0.606	0.570	0.526	0.502	0.484	0.728	0.741	0.730	0.759	0.756
Transfer	0.004	0.004	0.003	0.003	0.003	0.004	0.005	0.005	0.004	0.005
Job changes (frequencies conditional on no retention)										
Same state	0.255	0.203	0.176	0.154	0.148	0.468	0.474	0.428	0.487	0.514
Migrate metro	0.051	0.052	0.042	0.044	0.055	0.014	0.017	0.014	0.019	0.019
Migrate other	0.075	0.073	0.063	0.060	0.087	0.020	0.019	0.023	0.020	0.025
Other changes (frequencies conditional on no retention)										
Retire	0.040	0.051	0.060	0.066	0.071	0.035	0.037	0.038	0.034	0.041
Formal exit	0.569	0.611	0.653	0.669	0.633	0.447	0.432	0.480	0.423	0.381

Note: End-years of annual worker continuations and transitions between jobs. Transfers are changes of establishment across state borders but within firms. Retirements include reported deaths on the job. Formal sector exits are to informal employment, unemployment, self employment, or out of the labour force.
Sources: RAIS (one per cent random sample), RDE-IED, and SECEX, 1996-2001.

Table 4: Establishment types and migration, 1997-2001

	Full sample		Migrants		Stayers	
	Number	Share	Number	Share	Number	Share
Workers with job change, switching establishment types						
domestic to foreign owned	5,422	0.026	733	0.035	4,709	0.025
foreign owned to domestic	3,256	0.016	492	0.024	2,764	0.015
non-exporting to exporting	9,759	0.047	1,027	0.050	8,732	0.047
exporting to non-exporting	11,024	0.053	1,082	0.052	9,942	0.054
Workers with job change, remaining in establishment types						
domestic establishments	196,922	0.954	19,381	0.937	177,541	0.956
foreign owned establishments	798	0.004	78	0.004	720	0.004
non-exporting establishments	180,360	0.874	18,243	0.882	162,117	0.873
exporting establishments	5,275	0.026	332	0.016	4,943	0.027
Number of observations	206,418		20,684		185,734	

Sources: RAIS (one per cent random sample), RDE-IED, and SECEX, 1997-2001.

exposure to foreign owned and exporting establishments. Since migration frequencies are small at the annual horizon, apparently minor differences can matter for migration outcomes. Of the 206,418 workers with a job change in our sample, 20,684 (10.0 per cent) migrate across states. And of these 20,684 migrants, 733 (3.5 per cent) switch into a foreign owned establishment from a domestic establishment with their cross-state move; 1,027 (5.0 per cent)

Table 5: Average workforce characteristics, by establishment type, 1997-2001

	Full Sample	Foreign	Domestic	Exporting	Non-exporting
Primary school	0.563	0.362	0.568	0.577	0.562
High school	0.303	0.363	0.302	0.303	0.303
Some college	0.033	0.083	0.032	0.040	0.032
College graduate	0.101	0.193	0.099	0.081	0.103
Female	0.372	0.259	0.375	0.243	0.384
Age	34.0	33.5	34.0	32.7	34.1
Number of observations	1,005,010	22,071	982,939	85,677	919,333

Sources: RAIS (one per cent random sample), RDE-IED, and SECEX, 1997-2001.

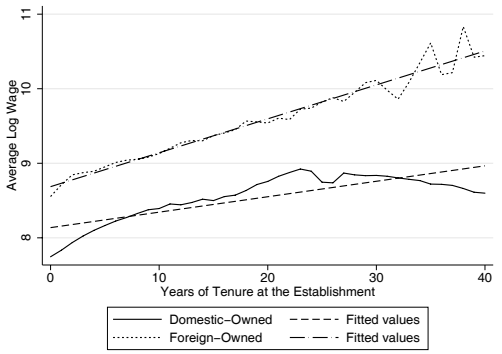
of the migrants switch into an exporting establishment from a non-exporting establishment after migration. Migrants are more likely to move to a job at a foreign owned or exporting establishment than the average worker: for non-migrants with a job change, the transition frequencies to a foreign owned or exporting establishment are only 2.5 per cent and 4.7 per cent, respectively. Workers with a job change from an exporter to another exporter are more likely to be non-migrants (2.7 per cent) than migrants (1.6 per cent), however, possibly because exporters are regionally clustered.

Employer characteristics. Table 5 shows that workers in foreign owned establishments are more educated on average than workers in their domestic establishment counterparts. Almost 20 per cent of workers at a foreign owned establishment are college graduates, while only 10 per cent of workers at domestic establishments have a college degree. Workers at foreign owned establishments are on average one-half year younger and less likely to be female than workers at domestic establishments. Workers in exporting establishments are also younger and more likely male than workers in non-exporting establishments. However, workers in exporting establishments are on average less educated. Fifty-eight per cent of exporting-establishment workers have only a primary school education.

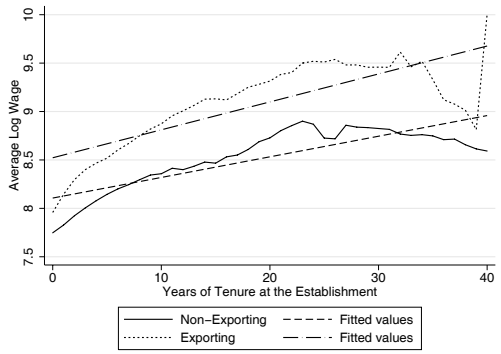
Wage differentials between current employment and expected future employment are a widely documented determinant of migration. Exporters and foreign owned establishments typically pay higher wages, partly because of more skilled workforces (see Table 5) and partly because of firm-fixed effects in compensation (Menezes-Filho, Muendler, and Ramey

Figure 3: Tenure-wage profiles, by establishment-type, 1997-2001

Domestic v. foreign



Non-exporting v. exporting



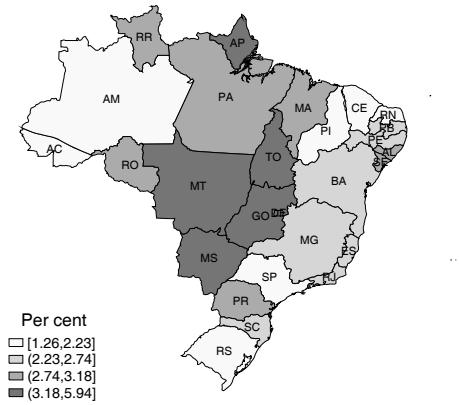
Sources: RAIS (one per cent random sample), RDE-IED, and SECEX, 1997-2001.

forthcoming). Beyond differences in spot wages, expected wage profiles provide incentives for job changes and migration. In Figure 3, we graph the average log wage for workers over years of tenure at the establishment, by establishment type. The tenure-wage profile for foreign owned establishments is considerably steeper than the tenure-wage profile for domestic-owned establishments, while there appears to be only a small difference between the tenure-wage paths for exporting and non-exporting establishments. In fact, based on evidence from linear prediction, an additional year of tenure at a non-exporting establishment is associated with 2.1 per cent higher wages, while an additional year at an exporting establishment relates to 2.9 per cent higher wages. Meanwhile, an additional year of tenure at a multinational enterprise predicts a wage increase by more than double the amount at a domestic-owned establishment (4.5 per cent as compared to 2.1 per cent).

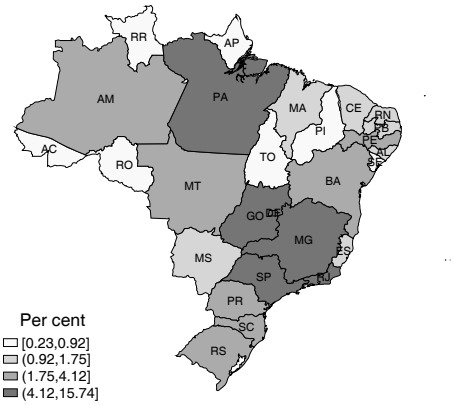
Emigrant and immigrant states. Figure 4 maps the frequency of formal sector emigration and immigration by state. Formal sector emigrants are most likely to come from the Northern regions. More than one in twenty workers from Tocantins in the sample migrate to another state between 1997 and 2001. Over 3 per cent of workers in Sergipe, Rondônia (RO), Roraima (RR) and Amapá (AP) leave for another state. The share of emigrants in the Centre-West region is similarly high. Close to 5 per cent of workers from Mato Grosso (MT) and the Distrito Federal are migrants. Emigrants are least likely to come from states in the South and Southeast. Only 1.5 per cent and 1.7 per cent of workers in Rio Grande do Sul and São Paulo, respectively, migrate to another state.

Figure 4: Emigration and immigration frequencies by state, 1997-2001

Emigrant shares by state



Immigrant shares by state



Source: RAIS (one per cent random sample), 1997-2001.

Immigration to the Southeast dominates. Over 15 per cent of the sample workforce head to the state of São Paulo, while 6.2 per cent and 5.8 per cent move to Minas Gerais (MG) and Rio de Janeiro states, respectively. The states of Goias and the Distrito Federal in the Centre-West, Pará in the North and Bahia in the Northeast, however, also receive relatively large flows of immigrants. This stands in contrast to the common assertion that the typical migrant flow in Brazil runs from North to South.

Although a large part of formal sector migration in Brazil is regional, there is substantial migration from great distances.[8] Emigrants from Acre in the North are most likely to move across the country to the state of Alagoas in the Northeast and migrants in Espírito Santo (ES) in the Southeast are most frequently from Alagoas. Not surprisingly, 14 out of 27 states send the highest shares of migrants to São Paulo. Meanwhile, among emigrants from São Paulo state between 1997 and 2001, almost 70 per cent moved within the South or Southeast, yet almost 21 per cent migrated to states in the Northern regions, and 13 per cent migrated to the Centre-West region. Immigrants to the Amazon state are most likely to arrive from within the North region, but close to 3 per cent of formal sector migrants moving to the state of Amazonas arrive from the South and Southeast regions.

[8]For a complete state-to-state transition matrix, please contact the authors.

4 Estimation of the migration decision

Our objective is to relate formal sector migration in Brazil to factors associated with Brazil's increasing integration into the global economy. In this section, we accumulate further descriptive evidence, in support of the previous section, using multivariate analysis. The approach allows us to simultaneously condition on multiple covariates associated with formal sector migration flows, and to discern their importance as predictors for migration. We first treat the self-selection problem inherent in the migration decision, by following a standard econometric approach in the literature and estimate a maximum likelihood model of selectivity-corrected wages developed by Heckman (1979). On the basis of these predicted wages, we follow the methodology proposed by Dahl (2002) and account for the multichoice decision problem of a migrant.

4.1 Self-selection bias

The neoclassical model of migration views expected utility differentials as the underlying forces for migration. Rational individuals optimize expected lifetime utility, given the expected earnings differential and costs to migrate. Non-pecuniary factors such as differences in regional amenities or land values may also enter the utility function and influence the migration decision.

Econometric studies analyzing migration decisions typically depart from a Mincer (1974) wage regression as follows

$$Y_i = \alpha X_i + \beta M_i + \delta Z_s + \epsilon_i \tag{1}$$

where Y_i are log wages for individual i, X_i is a vector of individual characteristics, M_i is a binary variable equal to one if the worker migrates, Z_s is a vector of characteristics for state s, and ϵ_i is the error term.

Estimation of the return to migration based on a comparison of wages (equation (1)) between migrants and stayers may be biased due to self-selection. A correctly specified β could only be recovered directly if we observed a worker once randomly induced to migrate and once to stay. Simplifying equation (1), β measures the expected difference in wage

outcomes for a worker, conditional on migration, that is

$$E(\beta|X, Z, M = 1) = E(Y_m|X, Z, M = 1) - E(Y_s|X, Z, M = 1)$$

where $E(\cdot|X, Z, M = 1)$ is the conditional expectation function (conditional on migration and a vector of covariates), and Y_m and Y_s are wage outcomes for a migrant and a stayer. The researcher knows the first element of the term, but it is impossible to observe the second part of the term—wages of a stayer conditional on the counterfactual circumstance that he migrates.

Consider the following decomposition of observed outcome variables—wages of migrants conditional on migration and wages of stayers conditional on staying

$$E(Y_m|X, Z, M = 1) - E(Y_s|X, Z, M = 1) + E(Y_s|X, Z, M = 1) - E(Y_s|X, Z, M = 0)$$

The first two terms of the expression represent the parameter of interest β, while the last two terms represent the self-selection bias—the difference in counterfactual outcomes depending on whether a worker migrates or stays. Self-selection may occur if migrants are selected by employers in the immigration state on the basis of worker characteristics or if migrants sort themselves into regions and occupations with the highest expected relative earnings.

4.2 An econometric model of migration with self-selection

Our estimation procedure derives from the Roy (1951) model of self-selection as extended by Dahl (2002). The approach allows the migration decision and the economic returns from migration to be determined simultaneously.

Consider the migration decision. An individual chooses to migrate depending on the gains and costs of migration. Neglecting other regional attributes for a moment, an individual will migrate if the expected wage differential from migrating exceeds the associated costs

$$Y_{mi} - Y_{si} > C_i$$

where Y_{mi} and Y_{si} are wages in the migration state and wages at home ('stayer state'),

respectively, and C_i are the associated costs of moving. Following the literature, we suppose that a worker's propensity to migrate depends on a linear combination of the wage differentials as well as individual, X_i, and state, Z_s, characteristics

$$I_i = \alpha_0 + \alpha_1[Y_{mi} - Y_{si}] + \alpha_2 X_i + \alpha_3 Z_s + \epsilon_i \tag{2}$$

As discussed, the econometrician cannot observe outcomes for an individual in both the migrant state (Y_{mi}) and the stayer state (Y_{si}). To overcome the self-selection problem, we first estimate a maximum likelihood Heckman (1979) selectivity correction. Our baseline estimation is as follows. The migration selection equation includes worker characteristics such as gender, age, and educational attainment as well as state-level characteristics such as urbanization rates, the log of per capita GDP, the log of state-average wages, and state-level log of value added in agriculture, manufacturing, and services as regressors. The wage outcome equation excludes state-level characteristics under the assumption that worker and employer characteristics exhaustively predict earnings.

Table 6 presents the results from maximum likelihood estimation. Column (1) reports selectivity-corrected coefficients for our baseline specification. All regressors in the outcome (wage) equation are highly significant and exhibit the expected sign.[9] Worker-specific variables in the migration equation are highly significant and corroborate the evidence from section 3.4: women are less likely to migrate than men; workers with at least some college are more likely to migrate than less-educated workers; migration is decreasing in age. State-level information is also largely consistent with the literature: the higher is the state's urbanization rate, log state-average wages, and the state's log value added in agriculture and manufacturing, the less likely is a worker to migrate. Interestingly, GDP per capita at t correlates significantly positively with migration. A worker is more likely to migrate within the formal sector if he resides in a high income state, in contrast to common priors. This result, however, does not necessarily run contrary to commonly found regional migration patterns: states like Goias often attract workers from states with higher per capita GDP, such as Minas Gerais and the capital city (Distrito Federal). Similarly, many migrants

[9]Women earn 41 per cent less than men; wages are increasing in the level of education and increasing with age, at a decreasing rate.

Table 6: Maximum likelihood estimates of selectivity-corrected wage coefficients

Dependent variable: log wages in $t+1$	(1)	(2)	(3)	(4)
Female	-0.408**	-0.417**	-0.250**	-0.192**
	(0.019)	(0.020)	(0.016)	(0.016)
High school graduate	0.463**	0.445**	0.223**	0.223**
	(0.011)	(0.011)	(0.010)	(0.011)
Some college	1.183**	1.152**	0.592**	0.527**
	(0.026)	(0.025)	(0.021)	(0.022)
College graduate	1.640**	1.610**	0.932**	0.894**
	(0.018)	(0.018)	(0.016)	(0.017)
Age at $t+1$	0.065**	0.066**	0.033**	0.027**
	(0.003)	(0.003)	(0.002)	(0.003)
Age at $t+1$ squared	-0.001**	-0.001**	-0.0003**	-0.0002**
	(0.00004)	(0.00004)	(0.00003)	(0.00003)
Selection equation: migrate				
Female	-0.337**	-0.337**	-0.335**	-0.334**
	(0.007)	(0.007)	(0.007)	(0.007)
High school graduate	-0.017*	-0.017*	-0.011	-0.006
	(0.007)	(0.007)	(0.007)	(0.007)
Some college	0.132**	0.132**	0.142**	0.152**
	(0.015)	(0.015)	(0.015)	(0.015)
College graduate	0.087**	0.087**	0.095**	0.107**
	(0.010)	(0.010)	(0.010)	(0.010)
Age at t	-0.010**	-0.010**	-0.010**	-0.010**
	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Urbanization at t	-0.131**	-0.131**	-0.134**	-0.136**
	(0.049)	(0.049)	(0.049)	(0.050)
GDP per capita at t	0.076**	0.076**	0.078**	0.077**
	(0.009)	(0.009)	(0.009)	(0.009)
Log average state wages at t	-0.209**	-0.209**	-0.209**	-0.202**
	(0.029)	(0.029)	(0.029)	(0.030)
Log value added in agriculture at t	-0.010**	-0.010**	-0.012**	-0.013**
	(0.004)	(0.004)	(0.004)	(0.004)
Log value added in manufacturing at t	-0.097**	-0.097**	-0.095**	-0.092**
	(0.009)	(0.009)	(0.009)	(0.009)
Log value added in services at t	0.050**	0.050**	0.049**	0.046**
Fixed effects: state at $t+1$		YES	YES	YES
Establishment controls at $t+1$			YES	YES
Establishment controls at t				YES
Number of observations	1,005,010	1,005,010	1,004,549	1,003,876

Note: Establishment controls include average wages, number of workers, the share of female workers, and the share of workers in eight age groups, four education groups, and five occupational groups. Robust standard errors in parentheses. ** denotes significance at 1 per cent level; * denotes significance at 5 per cent level.
Sources: RAIS (one per cent random sample) and IBGE, 1997-2001.

from São Paulo arrive in the neighboting state of Paraná, despite the lower per capita GDP. The sign is also consistent with the economic rationale that skilled formal sector emigrants from high-income states may expect to find formal sector jobs with steeper or more certain wage paths at employers in lower-income states. Column (2) includes controls for state-level dummies.

We augment our baseline specification to include employer-level controls both before and after the migration decision. Identification of the selectivity-corrected coefficients in column (2) derives from the excluded state-level sectoral compositions in the outcome equation. By including employer-level information, these state-level characteristics arguably matter less for wage determination, but are still important factors for migration. Column (3) presents results with employer controls after the migration decision in the outcome equation, and the specification in column (4) also includes establishment controls before the migration decision in the outcome equation. Establishment controls are average log wages, the log number of workers, the share of female workers, and the share of workers in six age groups, four education groups, and five occupational groups.

In our preferred specification with employer controls before and after the migration decision (column 4), all regressors in the wage equation are still highly significant and exhibit the expected sign. After inclusion of employer-level information, the bias-corrected coefficients on the individual characteristics move towards zero as expected. Meanwhile, coefficients in the selection equation have changed minimally. The omitted results on employer-level controls in the outcome equation (not reported) are consistent with priors—employment at an establishment with higher average wages both before and after migration is positively correlated with a worker's wages.

We predict bias-corrected wages for workers in all 27 Brazilian states as migrants and stayers with the coefficient estimates from column (4) of Table 6. We follow the Dahl (2002) methodology that extends Roy (1951) to multichoice migration decisions by grouping workers with similar characteristics into worker cells. We define cells by eight age categories[10], two gender categories, and four education categories.[11] Our so transformed data set includes

[10]Child (10-14 yrs.), youth (15-17 yrs.), adolescent (18-24 yrs.), nascent career (25-29 yrs.), early career (30-39 yrs.), peak career (40-49 yrs.), late career (50-64 yrs.), and post-retirement (65+).

[11]Primary school (grade 8 or less), high school graduate (grade 9-12), college dropout, college graduate.

135,044 cells with an average of 187 workers per cell.

We generate a matrix of migration probabilities calculated for each state s as the fraction of workers in the cell who migrate from state s to state m in year t. We then adapt equation 2 to include M_{csm}, the probability that a worker from cell c migrates from state s to state m, as follows

$$M_{csm} = \alpha_0 + \alpha_1[\hat{Y}_{cm} - \hat{Y}_{cs}] + \alpha_2 X_c + \alpha_3 Z_s + \epsilon_{cms} \tag{3}$$

where c denotes the 135,044 cells, $\hat{Y}_{cm}$ and $\hat{Y}_{cs}$ are computed as the cell-average of the bias-corrected predicted wages from the Heckman (1979) selectivity correction for migrants and stayers, X_c includes cell characteristics (gender, age, educational attainment), and Z_s includes state-level characteristics.

For the purpose of this study on the relationship between formal sector migration and recent market-oriented policy reforms in Brazil, our main specification augments equation (3), such that X_c includes cell-average employer characteristics. For instance, our analysis relates the following predictors to cell c's probability of migration: the share of workers in cell c employed at a foreign owned establishment, the share of workers in cell c employed at an exporting establishment, and the cell-average establishment-level tenure-wage profile. We measure the tenure-wage profile as the gradient between establishment-average wages for workers with less than a year of tenure and establishment-average wages for workers with 30 years of tenure. We also augment the vector Z_s to include state-level globalization-related characteristics, such as the state share of foreign owned establishments, the state share of exporting establishments, state-level log of exports, and state-level log of imports, as additional regressors. The latter exports and imports regressors serve as controls for a location's exposure to global competition.

4.3 Globalization and formal sector migration

Table 7 reports results from ordinary least squares estimation of equation (3). We regress worker cell migration probabilities on cell characteristics and state characteristics, pooling the migration probabilities of all cells from all states s to all states m. All regressions are weighted by the number of workers in each cell and standard errors are clustered at the

emigration-state-level to account for spatial correlation of errors.

Column (1) reports estimation results for a simple model in which interstate wage differentials and worker characteristics may be related to the migration decision. The result, after controlling for worker characteristics like gender, age, and educational attainment, and using selectivity-corrected wage differentials, suggests that interstate wage differentials are positively correlated with a worker's decision to migrate. A one percentage point increase in the spot wage differential is associated with a 0.2 per cent increase in the probability of cross-state migration. The remaining cell-specific variables are highly significant and corroborate the evidence from section 3.4: women are less likely to migrate than men, while the probability of migration is increasing in the level of education and decreasing in age. In column (2), we add emigration-state fixed effects, emigration-state time-varying controls, and emigration-establishment controls, including the cell-average establishment-level 30-year tenure-wage profile. The expectation of higher future wages in the current establishment significantly reduces the likelihood of migration, and the interstate wage differential remains significantly positively correlated with the migration frequency.

Specification (3) introduces employer characteristics related to globalization, including the share of the cell employed in a foreign owned establishment and the share of the cell employed in an exporting establishment. Employment at a multinational firm is not statistically significantly associated with migration. But results suggest that employment at an exporting establishment is negatively related to internal migration. A one standard deviation (approximately 10 percentage points) increase in the share of the cells employed at exporting establishments is associated with a 3 percentage point decrease in the probability of migration. This finding is consistent with the idea that the business success of exporting establishments informs workers' migration decisions.

Including state-level controls related to globalization in column (4) offers similar conclusions. The share of the cell employed at an exporting establishment remains negatively correlated with the probability of migration. Controlling for the share of exporting establishments in the state, an increase in the share of the cell employed at an exporting establishment of ten percentage points (one standard deviation) relates to a 2 percentage point decrease in the probability of migration.

Table 7: Formal sector migration in Brazil

Dependent variable: migration probability	(1)	(2)	(3)	(4)	(5)
Job characteristics					
Predicted wage diff. $(\hat{Y}_{cm} - \hat{Y}_{cs})$	0.002**	0.002*	0.002*	0.002*	-0.0002
	(0.0003)	(0.001)	(0.001)	(0.001)	(0.0006)
Employer characteristics					
Tenure-wage profile in t		-0.004*	-0.004*	-0.004*	-0.005
		(0.002)	(0.002)	(0.002)	(0.004)
Tenure-wage profile in $t+1$					0.001
					(0.005)
Employed in a foreign establ. in t			0.001	0.001	-0.001
			(0.001)	(0.001)	(0.001)
Employed in a foreign establ. in $t+1$					0.002
					(0.001)
Employed in an exporting establ. in t			-0.003**	-0.002**	-0.001
			(0.0004)	(0.0004)	(0.001)
Employed in an exporting establ. in $t+1$					-0.003**
					(0.001)
State characteristics related to globalization					
Share of foreign establishments in t				0.004	-0.010
				(0.013)	(0.024)
Share of foreign establishments in $t+1$					0.175*
					(0.072)
Share of exporting establishments in t				-0.023	-0.040
				(0.040)	(0.056)
Share of exporting establishments in $t+1$					-0.059**
					(0.016)
Worker controls	YES	YES	YES	YES	YES
Emigration-establishment controls		YES	YES	YES	YES
Emigration-state fixed effects		YES	YES	YES	YES
Emigration-state controls		YES	YES	YES	YES
Immigration-establishment controls					YES
Immigration-state controls					YES
Number of observations	135,044	103,688	103,688	103,688	102,570

Note: Worker cells formed by eight age, two gender, and four educational-attainment categories. State-level controls include urbanization rates, GDP per capita, average state wages, value added from agriculture, services, and manufacturing, exports and imports. Establishment controls include average wages, number of workers, the share of female workers, and the share of workers in eight age groups, four education groups, and five occupational groups. Regressions are weighted by cell size. Robust standard errors, clustered at the state-level, in parentheses. ** denotes significance at 1 per cent level; * denotes significance at 5 per cent level.
Sources: RAIS (one per cent random sample), IBGE, RDE-IED, and SECEX, 1997-2001.

Descriptive evidence in Table 4 shows that workers at exporters and multinational enterprises are markedly more likely to move to another exporter or multinational enterprise, when changing jobs, than workers at non-exporters or domestic establishments. A concern is therefore that omitting variables related to the worker's employment and location after migration could drive results in columns (1) through (4). We address the concern by including variables for the immigration state and immigration establishment in specification (5).[12] Employment at an exporting establishment in the initial year continues to be negatively related to internal migration, and similar in magnitude, though it loses significance. Migration is significantly negatively related to employment at an exporter after the migration decision and the share of exporters at the immigration location. These results are in line with evidence in Table 4 that non-migrants with a job change more often find re-employment at exporting establishments than migrants. Migration is significantly positively related with a larger share of multinational enterprises at the immigration location, however. A ten per cent increase in the concentration of foreign owned establishments at potential immigration locations is associated with a 1.8 percentage point increase in the migration rate. This result is consistent with the idea that locations that attract multinational enterprises are also economically appealing locations for internal formal sector migrants.

The results of our multivariate analysis, as well as the descriptive findings in section 3.4, provide support for the idea that globalization acts on internal migration through the growth of employment opportunities at locations with a high concentration of foreign owned establishments and the stability of employment at exporting establishments:[13] a ten percentage point increase in exporter employment relates to a 2 percentage point reduced probability of migration, and a ten per cent increase in the concentration of foreign owned establishments at potential immigration locations relates to an about equal-sized increase in the migration rate. The importance of the presence of foreign owned establishments in the immigration region, beyond the spot wage, is consistent with the economic rationale that migrants can expect benefits beyond the spot wage differential, such as steeper wage paths

[12] A more rigorous treatment of immigration-employer and immigration-state predictors would require estimation of differences in emigration-immigration characteristics similar to the two-step approach for spot wages. The derivation and implementation of an according statistical model remains a task for future research.

[13] Results from regressions by region (not reported) illustrate these points further.

at foreign owned establishments (Figure 3) or more favourable labour-market conditions in areas where multinational enterprises locate. The magnitudes of the migration flow changes, predicted by exporter employment and the concentration of foreign owned establishments at the destination location, are potentially large, given an annual overall migration rate of only two per cent.

5 Concluding remarks

This chapter investigates how factors related to globalization are associated with internal migration flows in a developing country. Using a novel matched data set of workers and their establishments across all states of Brazil, we show that formal sector internal migration flows are positively related to a high concentration of foreign owned establishments at the destination location, while workers with employment at exporting establishments are less likely to migrate. Our estimation approach corrects for self-selection of migrants and controls for interstate wage differentials as well as worker and state characteristics. Rigorous identification strategies for the causal effects that destination-locations characteristics exert on migration flows are beyond the scope of this descriptive paper, however. A potentially fruitful path for analysis is the estimation of differences in emigration-immigration characteristics similar to our two-step approach for spot wages, based on Dahl (2002). The derivation and implementation of an according statistical model remains a task for future research.

Findings of our descriptive analysis are consistent with the idea that globalization acts on internal migration through the growth of foreign owned establishments and employment opportunities beyond spot wage differentials and the stability of employment at exporting establishments. Given annual formal sector migration rates of around two per cent, the magnitude of globalization-predicted migration flows are potentially large. A one percentage point increase in exporter employment is associated with a 0.2 percentage point reduced probability of migration, and a one per cent increase in the concentration of foreign owned establishments at potential migration destinations relates to an about equal-sized increase in the migration rate.

Recent research advances the hypothesis that return migration may be a leading cause of the large and unprecedented flows of people from Southern to Northern regions in Brazil (see Fiess and Verner (2002) for a discussion and an opposing view based on evidence from a household cross section). Our findings support the view that the frequent location of foreign owned and exporting establishments in the Northern and Northeastern states may be a reason for return migration from the South and Southeast.

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