How employee churn drives the labor market dynamics: an initial descriptive investigation using firm-level evidence from Costa Rica

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Abstract

Two models were reviewed that allowed us to calculate the churn rate per company per year - 2020 (pandemic), 2021 (pandemic), and 2022 (post-pandemic), by sector, by the process that those companies carry out in the country, and per year of operation in the country. The findings show there seems to be a pandemic-induced decrease in churn rates for corporate services. Churn reallocates workers from less productive uses to more productive ones. Using model 1 of Burgess et al. (2000) we find that for every new reallocated job there were on average 4 rellocated workers in services and 4.5 in manufacturing during the study period. This result is a measure of how dynamic these sectors are for Costa Rica. In addition, using the definition of churn of Lazear & McCue (2018) we find that the churn rate is higher for jobs with less labor specialization, but the churn rate for women is lower than that of men in these less specialized jobs. For more specialized jobs, however, the churn rate seems similar between genders, although it tends to be lower for women. Workers over the age of 40 have a lower job reallocation rate. Finally, churn rates in manufacturing companies behave differently from those of information technology-related services due primarily to the heterogeneity of the worker composition in the different job specialization categories.

Keywords: Churn rate, pandemic, foreign companies, gender, job specialization, job position, Costa Rica

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Introduction

Hires occur for two reasons—to grow a business and to replace those who have left. Hiring can be for expansion, or it can be associated with churn. Analogously, separations reflect a decrease in the size of the business or the departure of a current employee who is replaced by a new employee. However, many firms hire new workers while separating from some of their existing workforce within relatively narrow windows of time. This leads to worker turnover in the economy that is larger than the observed job creation and destruction; in short, there exists worker churn (see Burgess et al., 2000; Davis et al., 2006, 2012).

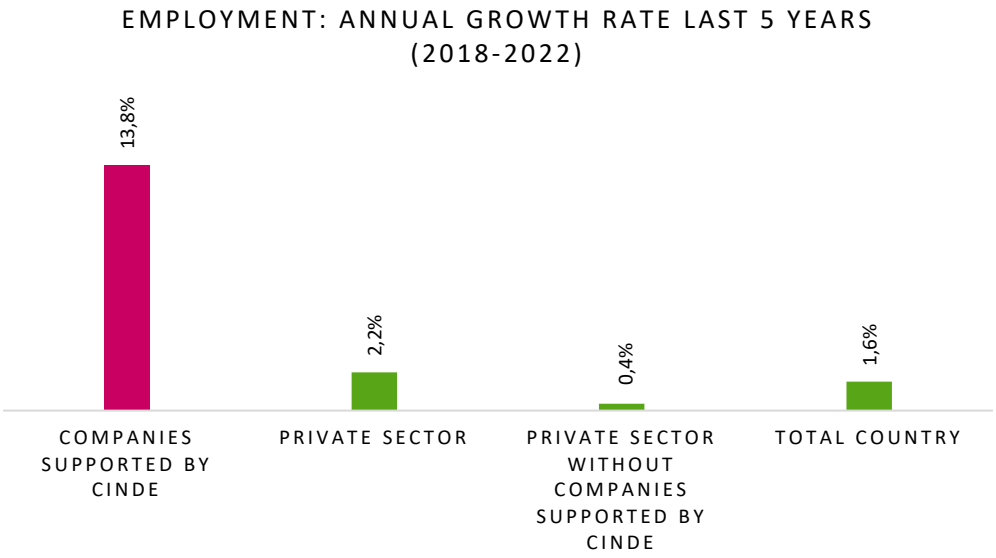
Employee or worker churn— the occurrence of both hiring and employee separations at a business establishment within an interval of time— is an important aspect of aggregate labor market dynamics.

Labor mobility plays a role in allocating workers to suitable jobs and is important in helping the economy adjust to shocks and structural change. But there are also benefits from longer job tenure, and costs associated with workers changing jobs. This article will present a detailed analysis of the movements of employees in foreign companies operating in Costa Rica. Two models will be reviewed that allow us to calculate the churn rate per company per year - 2020 (pandemic), 2021 (pandemic), and 2022 (post-pandemic), by sector, by the process that those companies carry out in the country, and per year of operation in the country. Those churn rates will be modeled according to the profile of the people employed by those foreign companies (e.g., age, job position, gender, among others). While most worker turnover is associated with the normal process of workers moving between existing jobs, structural change and economic shocks also drive turnover by changing the number and type of jobs available in the economy. The movement of existing workers between different jobs has been an important mechanism facilitating changes in the industry and geographic structure of employment over the last years.

Why Costa Rica

The nature of FDI inflows to Costa Rica differs significantly from inflows to the rest of Latin America. While several countries (particularly in South America) attract the most FDI in natural resource sectors, Costa Rica concentrates its inflows to the technology and knowledge-intensive sectors. The economic driver is, in this case, the availability and quality of local human capital. A more productive local human capital – with innovative skills, currently working for foreign companies – is particularly appealing to foreign companies without operations in Costa Rica. The availability of this highly skilled human capital sends a signal to other efficiency-seeking companies about Costa Rica's appeal as the ideal location for the true return of FDI. The demonstration effect has worked. Foreign firms face greater uncertainties than domestic firms in the host country; they may have strong incentives to follow previous investors because of the signal they send as to the reliability of the host country's location (Krugman, 1997).

This preliminary study was conducted with foreign companies coming to Costa Rica for efficiency-seeking in four main sectors: corporate services, digital technologies, life sciences (manufacturing), and other manufacturing. These companies have led in job creation in this country for the last five years; hence the relevance of understanding the factors that affect the dynamics of this labor market.



Unique Database

The most important source of information for the present study comes from the Social Security Fund (CCSS, for its acronym in Spanish), which collects data on reported salaries and employment per company for all those who comply with the mandatory social charges. This data is anonymized at the employee and company level; however, the CCSS keeps the same ID for firms and employees in the whole database, and thus each company and employee can be monitored separately every quarter. This database includes more than 400 CINDE-supported foreign companies (228 firms (57%) come from the knowledge-based sector) with a total of more than 179,000 employees (+112,000 employees (63%) come from the knowledge-based sector) for 2022 and comprises pre and post pandemic periods, since it ranges from 2019 to 2022; specifically, we use September for each year.

Number of CINDE-supported companies and their employment by year

	Foreign Firms			People Employed		
	In FTZ	**Outside FTZ**	**Total**	**In FTZ**	**Outside FTZ**	**Total**
2019	256	66	322	113,092	5,473	118,565
2020	269	73	342	134,981	6,573	141,554
2021	287	91	378	144,230	14,504	158,734
2022	304	97	401	164,149	15,001	179,150

For this study, the labor force was considered according to different categories such as age group (classified as 18-29, 30-39, and 40+), gender, and degree of specialization (high, medium-high, medium, and low). Specialization levels are approximated based on occupations as follows:

- High: Directors and managers
- Medium-high: Professionals, scientists and intellectuals, mid-level professionals and technicians
- Medium: Administrative support staff, assembly machine and facility operators
- Low: Basic occupations, officers, operators and artesans of mechanical arts and other trades, service workers and merchant and market salespeople, farmers and skilled agricultural, forestry, and fishery workers

In the case of services, companies in the corporate services or digital technologies subsectors are compared with those of life sciences and manufacturing (including light and advanced) throughout the study.

Model 1:

Employment at employer (e.g., firm) *i* at time *t* is denoted E_{it}. In calculating rates, we follow Davis and Haltiwanger (1990) and Burgess, Lane, and Stevens (2000) in using as denominator the average of current and past employment, denoted $N_{it} = (E_{it} + E_{it-1})/2$.

Job flows refer to change in employment: $JF_{it} = E_{it} - E_{it-1}$ and job reallocation is the absolute value of job flows, $JR_{it} = IJF_{it}I$. Job creation (JC) is a positive job flow, job destruction (JD) is a negative job flow: $JC_{it} = JR_{it}$ if $JF_{it} > 0$, $JD_{it} = JR_{it}$ if $JF_{it} < 0$. The corresponding rates are the levels divided by N_{it} (i.e., hiring rate $HR_{it} = H_{it}/N_{it}$). The aggregate number of job flows that we report are, as in Davis and Haltiwanger (1990), simply the sum of jobs created, destroyed, and reallocated divided by the aggregate employment level.

Total worker flows are defined as the sum of hires and separations, $WF_{it} = H_{it} + S_{it}$. Job flows are clearly $JF_{it} = H_{it} - S_{it} = E_{it} - E_{it-1}$. Worker flows can thus be written as $WF_{it} = JR_{it} + CF_{it}$ where CF is the level of excess worker flows or churning. The first of these components, JR, is the counterpart to job flows and is necessary to accomplish employer's growth or decline. This is the job reallocation component that has been studied by others (Leonard 1987; Dunne, Roberts, and Samuelson 1989; Davis and Haltiwanger 1990, 1992; Anderson and Meyer, 1994; Organization for Economic Cooperation and Development [OECD], 1994). The second of these, CF, is worker flows in excess of job flows, which we call churning. It represents the difference between labor reallocation and job reallocation and can arise from employers churning workers, or workers quitting and being replaced (Burgess, Lane, and Stevens, 2000).

$$CF_{it} = (H_{it} - JC_{it}) + (S_{it} - JD_{it})$$

The introductory example can be used to illustrate these definitions. Suppose an employer of 100 employees increases employment by 10, and this is achieved by 15 hires and 5 separations. The job flow JF is +10 (15 hires - 5 separations), as is the job reallocation flow JR>0. The worker flow WF is 20 (15 hires + 5 separations), and the churning flow CF is 10 (WF- JR). Job creation JC is 10 and job destruction JD is 0. There are, thus, 10 jobs but 20 workers reallocated, and a focus on job reallocation alone would miss much of the labor reallocation.

Churning Flow Rate:

$$CFR_{it} = \frac{(H_{it} - JC_{it}) + (S_{it} - JD_{it})}{N_{it}}$$

Worker Flow Rate:

$$WFR_{it} = \frac{H_{it} + S_{it}}{N_{it}}$$

If job creation exists:

$$CFR_{it} = WFR_{it} - \frac{JC_{it}}{N_{it}} = WFR_{it} - JCR_{it}$$

Otherwise (job destruction exists):

$$CFR_{it} = WFR_{it} - JDR_{it}$$

If job flows equal 0. Job flows refer to the change in employment: $JF_{it} = E_{it} - E_{it-1}$

$$\Leftrightarrow CFR_{it} = WFR_{it}$$

Additionally, there are different ways of measuring the importance of churning flows in worker flows. For example, by taking the mean of the ratio (CFR/WFR) over time and employers (e.g., firms).

Model 2:

Hires occur for two reasons—to grow a business and to replace those who have left. Hiring can be for expansion, or it can be associated with churn. Analogously, separations reflect a decrease in the size of the business or the departure of a current employee who is replaced by a new employee (Lazear and McCue, 2018). The importance of churn, growth hires, and employment-decreasing separations changes over the business cycle in a logical way.

Churn is an important part of employment dynamics, allowing workers to move to their most productive use. Although churn has no direct effect on employment growth since for every worker who separates from a business another worker is hired into the business, understanding churn helps provide a clearer picture of what happens to the labor market when the economy slows and when it recovers.

In expanding businesses, hires can be decomposed into growth hires and replacement hires. For example, a business that expands by three may hire seven workers and lose four workers to quits, layoffs, or retirement. The four workers hired to replace the separating workers are replacement hires, and the remaining three workers are hired to grow the business. Note that growth hiring in expanding businesses is the same as job creation.

Also note that the number of replacement hires in expanding businesses is equal to the number of separated workers in expanding businesses. In contracting businesses, separations can be decomposed into separations that decrease the size of the business and separations that are replaced by hired workers.

The number of replacement separations in contracting businesses is the same as the number of workers hired in contracting businesses, and separating workers to decrease employment in the

business is the same as job destruction. To complete the accounting framework, the number of hires in zero-growth businesses is identical to the number of separations in zero growth businesses. Churn is defined as the hires and separations that offset each other within a business. Thus, churn is defined formally as the minimum of hires and separations by the employer i in a given time period t (Lazear and McCue, 2018).

$$CF_{it} = Min(H_{it}, S_{it}) \Leftrightarrow CFR_{it} = \text{Min } (HR_{it}, SR_{it})$$

First descriptive statistical analysis

Job and Worker Reallocation in Corporate Services Sector

Year	Worker Flow Rate	Job Reallocation Rate	Churning Rate		Churning Flow / Worker Flow		# of Workers	# of Employers
			Model 1	Model 2	Model 1	Model 2		
2020	0,57	0,19	0,32	0,19	0,56	0,33	58 759	107
2021	0,64	0,14	0,51	0,27	0,79	0,42	68 249	113
2022	0,63	0,11	0,47	0,25	0,74	0,40	77 917	129
Mean	0,62	0,14	0,43	0,24	0,70	0,38	68 308	116
Compound annual growth rate							15,2%	9,8%

Job and Worker Reallocation in Digital Technolgies Sector

Year	Worker Flow Rate	Job Reallocation Rate	Churning Rate		Churning Flow / Worker Flow		# of Workers	# of Employers
			Model 1	Model 2	Model 1	Model 2		
2020	0,41	0,08	0,26	0,17	0,64	0,40	22 593	75
2021	0,60	0,19	0,37	0,16	0,61	0,27	27 619	81
2022	0,54	0,16	0,35	0,19	0,65	0,36	30 270	96
Mean	0,52	0,14	0,33	0,17	0,63	0,34	26 827	84
Compound annual growth rate							15,7%	13,1%

Job and Worker Reallocation in Life Sciences Sector (manufacturing)

Year	Worker Flow Rate	Job Reallocation Rate	Churning Rate		Churning Flow / Worker Flow		# of Workers	# of Employers
			Model 1	Model 2	Model 1	Model 2		
2020	0,43	0,09	0,27	0,17	0,64	0,39	38 248	70
2021	0,46	0,13	0,31	0,17	0,66	0,36	43 623	78
2022	0,54	0,15	0,35	0,20	0,65	0,36	50 613	82
Mean	0,48	0,12	0,31	0,18	0,65	0,37	44 161	77
Compound annual growth rate							15,0%	8,2%

Job and Worker Reallocation in Other Manufacturing Sector

Year	Worker Flow Rate	Job Reallocation Rate	Churning Rate		Churning Flow / Worker Flow		# of Workers	# of Employers
			Model 1	Model 2	Model 1	Model 2		
2020	0,37	0,03	0,20	0,17	0,55	0,45	14 405	73
2021	0,48	0,18	0,25	0,15	0,52	0,32	17 202	81
2022	0,46	0,03	0,29	0,21	0,63	0,47	17 640	86
Mean	0,44	0,08	0,25	0,18	0,57	0,41	16 416	80
Compound annual growth rate							10,7%	8,5%

COVID-19 (2020) pandemic-induced decreases in churn are important because they are likely to reduce the effectiveness with which the labor force operates. Churn moves workers from less productive uses to more productive ones. The cost of lower churn might be substantial if the reduced movement of labor that occurs during economic contraction is permanent or long-lasting.

Worker flow rate and job reallocation rate crisis comparison

Sector (average)	Worker Flow Rate (WFR)	Job Reallocation Rate (JRR)	WFR / JRR	
			Costa Rica[a/]	USA [b/]
Services	0,57	0,14	4,0	3,4
Manufacturing	0,46	0,10	4,5	2,6

a/ Average for 2020, 2021, and 2022
b/ Data for 2000 https://www.jstor.org/stable/10.1086/209967?origin=JSTOR-pdf

With these new labor metrics we can compare labor market dinamics between countries. The Burgess et al. (2000) model analyzes an eastern state in the U.S. with 1.5 million people in the occupied labor force. Its data partially captures the start of the international dot.com crisis. The first conclusion is that the worker flow rate is greater than the job reallocation rate in the two sectors and in both countries. One way to read this data is to say that for every new job created in the services sector an average flow of four workers was generated in Costa Rica for the pandemic period while the flow for the U.S. during the dot.com crisis was of 3.4. At first glance, the manufacturing sector reallocated almost 50% more workers in Costa Rica than in the U.S. The comparison may seem somewhat unfair to some, but these two sectors clearly drive the economy and employment in Costa Rica.

Appendices 1, 2, and 3 give detailed information for 2020, 2021, and 2022 by sector, company size, and time operating in the country. The most relevant ISIC Rev 4 codes by sector are also added. In some cases there seems to be an inverse relationship between complexity of the processes carried out in the country (using the ISIC Rev 4 definitions) and churn rate.[4]

New entrants put pressure on new worker hiring and this affects more those companies with more time operating in the country. These have higher worker flow rates due to hirings and increasing retention costs because of more resources used for training new hires. This result is consistent with the findings of Burgess et al. (2000).

[4] International Standard Industrial Classification of All Economic Activities (ISIC), Rev.4
https://www.oecd-ilibrary.org/content/publication/8722852c-en

Second descriptive statistical analysis

The intention of this study was to obtain a representation of employment dynamics in Costa Rica for 2021-2022. To this end the analysis used the concepts of hires (which can reflect expansion or replacement due to vacated jobs) and separations (contraction or replacement needed due to deficient skills or voluntary separation). This posed several complicated questions: Are the separations due to deficient skills the norm for the industry? How much of the employment corresponds to replacement hires?

To answer the first question, the study evaluated the change of salary and specialization of workers who moved from one company to another in the specific period. Only those with a single job per period (equivalent to full time) in a CINDE-supported company were considered. This section seeks to contribute to the discussion of the cause of reallocation in knowledge-intensive industries considering salary as compensation for the underlying productivity. However, since this sample only consisted of CINDE-supported companies, analyzing worker reallocation outside of the private multinational sector was impossible. For the reallocation analysis, then, only workers with a job in a CINDE-supported company in both periods were considered.

A characterization was later made of the labor market dynamics by industry with the concept of churn used in Lazear & McCue (2018), which takes the minimum value between hires and separations. This concept primarily concerns reallocation caused by the need to fill job vacancies, so it is not part of the flows that determine employment growth and has therefore not been analyzed in depth. This, added to employee characteristics such as specialization, gender, and age group, allowed us to see whether some group or industry was particularly dynamic.

Labor reallocation and salary change

For the following descriptive analysis, the database was cleansedsince the main objective was to visualize the effects of full-time jobs. The minimum legal wage of workers in unskilled jobs with a regular work day (₡352,165) was considered the low salary threshold. Ceilings were also set for salaries (₡6,000,000) and salary increases (110%) to eliminate atypical values corresponding to bonuses or other payments. To divide the sample into sectors, the 2022 industrial employer sector (corporate services, digital technologies, life sciences, or manufacturing) was used.

The following tables give the descriptive statistics for the main variables that were used. A simple analysis shows widely disperse data for the different categories. For most of the cases, the standard deviation reaches levels higher than 20 p.p., making it difficult to establish patterns by characteristic. In addition, the relationship between these variables and salary change does not appear to follow a known distribution, indicating that an analysis based on averages would not be the best way to represent reality. Given this, the decision was made to describe the state of reallocation by crossing data that characterized both reallocated workers and non-reallocated (retained) workers.

Salary Change Statistics, Corporate Services Sector 2022

		min	max	median	SD	n
All		-0.924	1.099	0.122	0.242	51,624
Age group						
	18-29	-0.715	1.1	0.152	0.257	26,045
	30-39	-0.897	1.1	0.108	0.227	18,154
	40+	-0.924	1.09	0.079	0.212	7,425
Gender						
	Men	-0.897	1.1	0.122	0.243	27,418
	Women	-0.924	1.1	0.122	0.241	24,206
Reallocation						
	Reallocated	-0.874	1.1	0.24	0.337	6,597
	Retained	-0.924	1.1	0.114	0.222	45,027
Specialization						
	Promoted	-0.765	1.1	0.233	0.289	4,321
	Same specialization	-0.924	1.09	0.114	0.232	45,487
	Deterioration	-0.874	1.09	0.187	0.313	1,816

Salary Change Statistics, 2022 Digital Technologies Sector

		min	max	median	SD	n
Total		-0.911	1.098	0.125	0.243	21,796
Age group						
	18-29	-0.908	1.1	0.176	0.271	8,203
	30-39	-0.904	1.1	0.116	0.228	9,493
	40+	-0.911	1.09	0.085	0.196	4,100
Gender						
	Men	-0.911	1.1	0.127	0.245	13,942
	Women	-0.908	1.1	0.12	0.24	7,854
Reallocation						
	Reallocated	-0.745	1.1	0.32	0.345	3,408
	Retained	-0.911	1.1	0.108	0.209	18,388
Specialization						
	Promoted	-0.641	1.1	0.296	0.333	1,142
	Same specialization	-0.911	1.09	0.117	0.232	20,129
	Deterioration	-0.904	1.1	0.221	0.321	525

In the characterization for each of the data crossings, “improved specialization” is understood as referring to those whose responsibilities in 2022 involved more specialization than those required by their job in 2021. The category of “deteriorated specialization” implies the opposite. Those with improved specialization and a salary increase were considered as “promoted”, while those with a salary increase but the same specialization were only considered as being in a “salary increase” situation. For this analysis, workers whose salaries did not change for the 2021-2022 period were not considered.

	Reallocated		Retained	
	Salary Increase	Salary Reduction	Salary Increase	Salary Reduction
Improved specialization	Promoted	Atypical	Promoted	Uncompensated
Same specialization	Salary increase	Deterioration	Salary increase	Uncompensated
Deteriorated specialization	Atypical	Deterioration	Atypical	Deterioration

Considering the possibility that labor reallocation in knowledge-intensive industries corresponds to a search for better salaries, an evaluation of the composition of the reallocated group was of the most interest. In the corporate services sector, some 13% of the sample, or 6,595 people, were reallocated. Within this group, 78% received a salary increase. It can be said that 62% of the reallocated cases did not consist of separations due to deficient skills since these were people who either remained in a job that required the same degree of specialization or were promoted. In addition, the reallocated group with salary reduction that saw a deterioration or stagnation in their specialization can be considered a potential group for separation due to skills. In the case of corporate services, this corresponded to 17% of reallocated workers.

Reallocations in the Corporate Services Sector, 2022

	Reallocated (13%)		Retained (87%)	
	Salary Increase	Salary Reduction	Salary Increase	Salary Reduction
Improved specialization	22%	4%	5%	1%
Same specialization	39%	12%	82%	12%
Deteriorated specialization	17%	5%	1%	0%
Total	6,95		44,778	

Reallocation in the Digital Technologies Sector, 2022

	Reallocated (16%)		Retained (84%)	
	Salary Increase	Salary Reduction	Salary Increase	Salary Reduction
Improved specialization	22%	4%	1%	0%
Same specialization	54%	10%	88%	9%
Deteriorated specialization	9%	2%	1%	0%
Total	3,408		18,243	

Reallocation in the digital technologies sector was proportionately higher (16%, or 3,408 people), but this reallocation also occurred to a greater extent as a form of payment for higher productivity. Some 84% of reallocated workers had a salary increase, while it can be said with certainty that 75% were in the group that received compensation for greater productivity. Separations due to skills corresponded to 12% of reallocated workers for this sector.

In general, it was found that the labor force in both services subsectors were reallocated more than in manufacturing industries (whether medical, advanced, or light). (See appendices.)

Churn rate characterization

Using the definition of churn in Lazear & McCue (2018), model 2, the industry rates were obtained according to employee characteristics such as age group, degree of specialization, and gender. These rates correspond to the minimum of hires and separations with regard to average employment in 2021 and 2022. The rates given were calculated using sectoral hires and separations data and using the established data crossing; that is, they do not correspond to company-level averages. These percentages should thus be read as the share of average employment of the industry and subgroup that was replaced in the study period.

For the corporate services sector, the churn rate was higher for less specialized jobs (medium and low specialization). These jobs also represented a major part of the sector's labor force since they accounted for 79% of workers in 2021. In both cases, reallocation was markedly greater for the under-30 age group. A possible explanation for this is found in companies with customer service processes or call centers since in 2021 these accounted for a third of all employees in corporate services with medium specialization.

Another fact that stands out is that women tended to be reallocated less than men in less specialized jobs. For more specialized jobs, however, the churn rate was similar between genders, although it was still likely to be lower for women. With respect to age group, there was less labor reallocation for people under the age of 40.

The digital technologies sector showed similar behavior. There was an inverse relationship between specialization level and churn rate, although for digital technologies, unlike corporate services, reallocation varied less between high and low specialization levels. In the preceding section this sector had a more proportionate reallocation behavior. However, the analysis indicated that this reallocation varied more between specialization levels than in corporate services since although 53% of the sector's employment in 2021 was in medium-high specialization, this subgroup did not appear to have a different churn rate. In addition, the relationship between gender, age group, and churn rate appeared to be similar to that of corporate services.

The churn rates of manufacturing and life science companies, compared to services, showed a different behavior due primarily to the worker composition in the different specialization categories. The relationship between age group and churn rate was maintained in all sectors: older people had less labor reallocation. Moreover, people under the age of 30 had high churn rates of up to 20% for medium/low specialization jobs in manufacturing and life sciences. This could be explained by temporary operator jobs or improved specialization of people moving outside the sample. In addition, contrary to what was seen in the services subsectors, there was no marked trend of reallocation by gender.

Churn Rate, Corporate Services 2021-2022

	Specialization Level											
	High			Medium-high			Medium			Low		
Age Group	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total
<30	10.4%	10.0%	10.2%	13.2%	9.5%	11.4%	17.1%	14.7%	16.0%	19.1%	14.0%	16.7%
30-39	11.2%	10.5%	10.9%	14.7%	12.3%	13.7%	16.0%	13.3%	14.8%	15.9%	12.9%	15.6%
40+	12.3%	8.5%	10.8%	13.1%	10.6%	12.2%	15.3%	12.7%	14.5%	14.8%	13.3%	15.7%

Churn Rate, Digital Technologies 2021-2022

	Specialization Level											
	High			Medium-high			Medium			Low		
Age Group	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total
<30	10.7%	11.3%	11.0%	13.8%	12.8%	13.5%	14.4%	12.4%	13.4%	15.4%	16.3%	15.7%
30-39	14.5%	12.1%	13.6%	13.9%	11.4%	13.1%	15.3%	11.9%	13.6%	13.4%	12.3%	13.0%
40+	12.0%	6.8%	10.4%	11.8%	10.0%	11.4%	16.6%	9.3%	13.3%	12.6%	9.5%	11.6%

Churn Rate, Life Sciences 2021-2022 (Manufacturing)

	Specialization Level											
	High			Medium-high			Medium			Low		
Age Group	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total
<30	10.5%	15.1%	12.1%	14.0%	13.8%	13.9%	21.2%	23.3%	22.2%	12.6%	12.6%	12.6%
30-39	9.3%	10.9%	9.9%	11.4%	12.0%	11.6%	13.5%	15.7%	14.3%	12.1%	11.4%	11.7%
40+	13.0%	10.2%	12.6%	10.1%	10.2%	10.2%	10.0%	12.6%	11.3%	8.2%	9.0%	8.7%

Churn Rate, Other Manufacturing 2021-2022

	Specialization Level											
	High			Medium-high			Medium			Low		
Age Group	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total
<30	23.3%	10.5%	19.8%	13.9%	13.2%	13.6%	15.9%	17.1%	16.5%	23.5%	24.8%	24.0%
30-39	10.5%	15.2%	12.1%	16.0%	11.9%	14.5%	13.2%	17.0%	14.6%	12.1%	18.0%	14.9%
40+	8.3%	14.0%	9.4%	8.4%	12.6%	9.8%	8.0%	12.8%	9.9%	9.5%	11.6%	10.1%

Final remarks

Two models were reviewed that allowed us to calculate the churn rate per company per year - 2020 (pandemic), 2021 (pandemic), and 2022 (post-pandemic), by sector, by the process that those companies carry out in the country, and per year of operation in the country.

The findings show there seems to be a pandemic-induced decrease in churn rates for corporate services. Churn reallocates workers from less productive uses to more productive ones. Using model 1 of Burgess et al. (2000) we find that for every new reallocated job there are on average 4 rellocated workers in services and 4.5 in manufacturing during the study period. This result is a measure of how dynamic these sectors are for Costa Rica.

In addition, using model 2 of Lazear & McCue (2018) we find that the churn rate is higher for jobs with less labor specialization, but the churn rate for women is lower than that of men for less specialized jobs. For more specialized jobs, however, the churn rate is similarbetween genders, although this rate is still likely to be lower for women. Workers over the age of 40 have a lower job reallocation rate. Finally, churn rates in manufacturing companies behave differently from those of information technology-related services due primarily to the heterogeneity of the worker composition in the different job specialization categories.

Before, experts and the foreign companies that participated in this study were only interested in measuring the labor turnover rate due to resignations and dismissals. We now know, however, that it does not matter if the best employees leave in search of other jobs —which was the case for a majority of the reallocated employees evaluated in this study— since, according to literature, churn reallocates workers from less productive uses to more productive ones. We now know that the employee flow rate and the job reallocation rate give a more complete view of why Costa Rica should try to close the supply and demand gap of companies that in the end drive the economy and improve the country's labor productivity.

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Appendix 1

2020 Job and Worker Reallocation in Corporate Services Sector

	Worker Flow Rate	Job Reallocation Rate	Churning Rate		Churning Flow / Worker Flow		# of Workers	# of Employers
			Model 1	Model 2	Model 1	Model 2		
All	0,57	0,19	0,32	0,19	0,56	0,33	58 759	107
Employer size								
Employment ≤ 50	0,52	0,15	0,27	0,18	0,52	0,35	473	19
50 < Employment ≤ 100	0,45	0,09	0,32	0,18	0,70	0,40	1 454	18
100 < Employment ≤ 500	0,54	0,02	0,32	0,26	0,59	0,48	10 799	45
500 < Employment ≤ 1,000	0,61	0,16	0,37	0,22	0,60	0,37	8 139	12
1,000 < Employment	0,58	0,26	0,31	0,16	0,54	0,27	37 894	13
Employer age								
Age ≤ 1 year (entrant)	1,98	1,91	0,03	0,04	0,01	0,02	776	4
1 < Age ≤ 3	0,53	0,27	0,19	0,13	0,37	0,25	2 838	11
3 < Age ≤ 5	0,38	0,12	0,23	0,13	0,61	0,34	2 432	9
5 < Age ≤ 10	0,53	0,00	0,32	0,26	0,61	0,50	8 901	33
10 < Age	0,58	0,22	0,34	0,18	0,58	0,31	43 812	50
ISIC Rev 4								
5229	0,93	0,62	0,26	0,15	0,28	0,16	1 652	5
6201	0,28	0,01	0,16	0,13	0,58	0,48	2 795	7
6920	0,62	0,19	0,24	0,21	0,39	0,34	2 284	11
7020	0,37	0,06	0,29	0,15	0,80	0,41	2 048	7
8211	0,35	0,04	0,25	0,15	0,72	0,44	12 571	31
8220	0,76	0,19	0,54	0,28	0,71	0,37	12 465	13

2020 Job and Worker Reallocation in Digital Technologies Sector

	Worker Flow Rate	Job Reallocation Rate	Churning Rate		Churning Flow / Worker Flow		# of Workers	# of Employers
			Model 1	Model 2	Model 1	Model 2		
All	0,41	0,08	0,26	0,17	0,64	0,40	22 593	75
Employer size								
Employment ≤ 50	0,84	0,06	0,45	0,39	0,54	0,46	647	30
50 < Employment ≤ 100	0,58	0,24	0,29	0,17	0,50	0,29	698	9
100 < Employment ≤ 500	0,47	0,00	0,29	0,23	0,61	0,50	5 997	26
500 < Employment ≤ 1,000	0,42	0,26	0,16	0,08	0,38	0,19	1 768	2
1,000 < Employment	0,36	0,09	0,26	0,14	0,71	0,38	13 483	8
Employer age								
Age ≤ 1 year (entrant)	0,37	0,03	0,22	0,17	0,60	0,45	945	10
1 < Age ≤ 3	0,64	0,17	0,30	0,24	0,46	0,37	883	13
3 < Age ≤ 5	0,59	0,06	0,36	0,27	0,60	0,45	5 689	13
5 < Age ≤ 10	0,38	0,06	0,26	0,16	0,67	0,42	3 470	19
10 < Age	0,32	0,09	0,22	0,12	0,68	0,36	11 606	20
ISIC Rev 4								
6201	0,41	0,13	0,26	0,13	0,63	0,32	5 556	24
6202	0,75	0,11	0,58	0,32	0,77	0,43	1 991	14
6209	0,85	0,13	0,33	0,36	0,38	0,43	358	6
7310	0,41	0,05	0,27	0,18	0,67	0,43	525	5
8220	0,37	0,08	0,19	0,15	0,50	0,40	3 278	7

2020 Job and Worker Reallocation in Life Sciences Sector

	Worker Flow Rate	Job Reallocation Rate	Churning Rate		Churning Flow / Worker Flow		# of Workers	# of Employers
			Model 1	Model 2	Model 1	Model 2		
All	0,43	0,09	0,27	0,17	0,64	0,39	38 248	70
Employer size								
Employment ≤ 50	0,90	0,47	0,25	0,22	0,28	0,24	429	22
50 < Employment ≤ 100	0,43	0,10	0,23	0,16	0,55	0,38	938	13
100 < Employment ≤ 500	0,22	0,00	0,15	0,11	0,68	0,49	4 996	18
500 < Employment ≤ 1,000	0,50	0,03	0,35	0,23	0,70	0,47	5 642	7
1,000 < Employment	0,40	0,14	0,26	0,13	0,64	0,33	26 243	10
Employer age								
Age ≤ 1 year (entrant)	0,95	0,59	0,36	0,18	0,38	0,19	57	3
1 < Age ≤ 3	0,74	0,50	0,22	0,12	0,30	0,16	495	8
3 < Age ≤ 5	0,59	0,19	0,37	0,20	0,62	0,34	3 165	5
5 < Age ≤ 10	0,45	0,04	0,28	0,21	0,61	0,46	5 535	22
10 < Age	0,40	0,08	0,26	0,16	0,66	0,40	28 996	32
ISIC Rev 4								
3250	0,42	0,07	0,26	0,17	0,62	0,41	27 337	42

2020 Job and Worker Reallocation in Other Manufacturing Sector

	Worker Flow Rate	Job Reallocation Rate	Churning Rate		Churning Flow / Worker Flow		# of Workers	# of Employers
			Model 1	Model 2	Model 1	Model 2		
All	0,37	0,03	0,20	0,17	0,55	0,45	14 405	73
Employer size								
Employment ≤ 50	0,62	0,09	0,29	0,27	0,46	0,43	561	28
50 < Employment ≤ 100	0,42	0,08	0,30	0,17	0,71	0,40	603	9
100 < Employment ≤ 500	0,41	0,01	0,17	0,20	0,42	0,49	6 254	27
500 < Employment ≤ 1,000	0,33	0,03	0,26	0,15	0,78	0,45	4 744	7
1,000 < Employment	0,27	0,07	0,13	0,10	0,49	0,36	2 243	2
Employer age								
Age ≤ 1 year (entrant)	1,04	0,65	0,32	0,20	0,31	0,19	467	7
1 < Age ≤ 3	0,44	0,24	0,18	0,10	0,40	0,23	472	4
3 < Age ≤ 5	0,15	0,07	0,06	0,04	0,39	0,28	747	5
5 < Age ≤ 10	0,44	0,01	0,35	0,22	0,79	0,49	3 790	18
10 < Age	0,33	0,06	0,15	0,14	0,47	0,41	8 929	39
ISIC Rev 4								
1030	0,63	0,08	0,20	0,28	0,32	0,44	910	5
2610	0,34	0,05	0,26	0,15	0,76	0,43	2 583	7

Appendix 2

2021 Job and Worker Reallocation in Corporate Services Sector

	Worker Flow Rate	Job Reallocation Rate	Churning Rate		Churning Flow / Worker Flow		# of Workers	# of Employers
			Model 1	Model 2	Model 1	Model 2		
All	0,64	0,14	0,51	0,27	0,79	0,42	68 249	113
Employer size								
Employment ≤ 50	0,54	0,19	0,21	0,17	0,40	0,32	481	20
50 < Employment ≤ 100	0,54	0,11	0,25	0,21	0,46	0,40	1 215	16
100 < Employment ≤ 500	0,63	0,12	0,39	0,26	0,62	0,41	11 495	49
500 < Employment ≤ 1,000	0,59	0,18	0,39	0,21	0,66	0,35	9 032	13
1,000 < Employment	0,66	0,09	0,56	0,28	0,86	0,43	46 026	15
Employer age								
Age ≤ 1 year (entrant)	1,47	1,31	0,16	0,08	0,11	0,05	289	7
1 < Age ≤ 3	0,79	0,34	0,45	0,23	0,57	0,29	2 232	8
3 < Age ≤ 5	0,36	0,06	0,27	0,15	0,77	0,41	3 068	10
5 < Age ≤ 10	0,59	0,19	0,35	0,20	0,60	0,34	10 497	31
10 < Age	0,66	0,08	0,55	0,29	0,84	0,44	52 163	57
ISIC Rev 4								
4649	0,29	0,10	0,18	0,09	0,63	0,32	3 044	5
5229	0,64	0,03	0,30	0,31	0,46	0,48	1 609	5
6201	0,46	0,22	0,23	0,14	0,51	0,30	3 342	7
6920	0,44	0,04	0,33	0,20	0,74	0,46	2 378	12
7020	0,48	0,17	0,30	0,15	0,63	0,32	2 502	8
8211	0,44	0,12	0,29	0,16	0,65	0,36	14 122	33
8220	0,97	0,09	0,86	0,44	0,89	0,45	16 310	13

2021 Job and Worker Reallocation in Digital Technologies Sector

	Worker Flow Rate	Job Reallocation Rate	Churning Rate		Churning Flow / Worker Flow		# of Workers	# of Employers
			Model 1	Model 2	Model 1	Model 2		
All	0,60	0,19	0,37	0,16	0,61	0,27	27 619	81
Employer size								
Employment ≤ 50	0,91	0,02	0,42	0,45	0,46	0,49	628	29
50 < Employment ≤ 100	0,83	0,25	0,50	0,28	0,60	0,34	753	11
100 < Employment ≤ 500	0,49	0,12	0,32	0,19	0,66	0,38	6 680	29
500 < Employment ≤ 1,000	0,50	0,22	0,28	0,14	0,56	0,28	1 503	2
1,000 < Employment	0,63	0,22	0,38	0,14	0,61	0,22	18 055	10
Employer age								
Age ≤ 1 year (entrant)	1,42	1,29	0,07	0,06	0,05	0,04	2 484	7
1 < Age ≤ 3	0,82	0,19	0,38	0,31	0,46	0,38	1 085	14
3 < Age ≤ 5	0,47	0,08	0,29	0,19	0,62	0,41	4 817	15
5 < Age ≤ 10	0,50	0,07	0,38	0,21	0,77	0,43	5 490	23
10 < Age	0,57	0,15	0,42	0,13	0,73	0,22	13 743	22
ISIC Rev 4								
6201	0,75	0,45	0,24	0,15	0,32	0,20	8 967	25
6202	0,69	0,04	0,57	0,32	0,82	0,47	2 105	15
6209	1,17	0,09	0,45	0,54	0,39	0,46	401	7
7310	0,51	0,21	0,29	0,15	0,56	0,30	646	5
8220	0,37	0,09	0,25	0,14	0,67	0,37	3 602	7

2021 Job and Worker Reallocation in Life Sciences Sector

	Worker Flow Rate	Job Reallocation Rate	Churning Rate		Churning Flow / Worker Flow		# of Workers	# of Employers
			Model 1	Model 2	Model 1	Model 2		
All	0,46	0,13	0,31	0,17	0,66	0,36	43 623	78
Employer size								
Employment ≤ 50	0,88	0,41	0,28	0,23	0,32	0,26	541	27
50 < Employment ≤ 100	0,48	0,14	0,31	0,17	0,63	0,35	638	9
100 < Employment ≤ 500	0,56	0,22	0,24	0,17	0,44	0,30	5 831	23
500 < Employment ≤ 1,000	0,50	0,17	0,32	0,17	0,65	0,33	5 480	7
1,000 < Employment	0,43	0,10	0,32	0,16	0,73	0,38	31 133	12
Employer age								
Age ≤ 1 year (entrant)	2,00	2,00	0,00	0,00	0,00	0,00	316	9
1 < Age ≤ 3	0,86	0,68	0,19	0,09	0,22	0,11	658	8
3 < Age ≤ 5	0,63	0,30	0,31	0,16	0,50	0,26	2 105	7
5 < Age ≤ 10	0,53	0,10	0,37	0,22	0,70	0,40	4 539	19
10 < Age	0,43	0,11	0,30	0,16	0,70	0,37	36 005	35
ISIC Rev 4								
3250	0,45	0,13	0,29	0,16	0,65	0,35	27 365	48

2021 Job and Worker Reallocation in Other Manufacturing Sector

	Worker Flow Rate	Job Reallocation Rate	Churning Rate		Churning Flow / Worker Flow		# of Workers in 2021	# of Employers
			Model 1	Model 2	Model 1	Model 2		
All	0,48	0,18	0,25	0,15	0,52	0,32	17 202	81
2021 Employer size								
Employment ≤ 50	0,49	0,10	0,24	0,20	0,49	0,40	579	31
50 < Employment ≤ 100	0,49	0,16	0,23	0,17	0,48	0,34	728	11
100 < Employment ≤ 500	0,42	0,10	0,24	0,16	0,56	0,38	7 489	30
500 < Employment ≤ 1,000	0,51	0,24	0,25	0,14	0,49	0,27	4 487	6
1,000 < Employment	0,57	0,28	0,28	0,14	0,50	0,25	3 919	3
Employer age								
Age ≤ 1 year (entrant)	2,00	2,00	0,00	0,00	0,00	0,00	231	4
1 < Age ≤ 3	0,66	0,14	0,38	0,26	0,58	0,40	985	10
3 < Age ≤ 5	0,21	0,04	0,14	0,08	0,64	0,40	760	4
5 < Age ≤ 10	0,57	0,15	0,41	0,21	0,71	0,37	3 994	20
10 < Age	0,44	0,19	0,19	0,12	0,44	0,29	11 232	43
ISIC Rev 4								
1030	0,51	0,01	0,35	0,25	0,69	0,49	910	6
2610	0,70	0,38	0,28	0,16	0,40	0,23	2 583	8

Appendix 3

2022 Job and Worker Reallocation in Corporate Services Sector

	Worker Flow Rate	Job Reallocation Rate	Churning Rate		Churning Flow / Worker Flow		# of Workers	# of Employers
			Model 1	Model 2	Model 1	Model 2		
All	0,63	0,11	0,47	0,25	0,74	0,40	77 917	129
Employer size								
Employment ≤ 50	0,76	0,32	0,27	0,22	0,36	0,29	744	31
50 < Employment ≤ 100	0,73	0,20	0,36	0,27	0,49	0,37	1 095	14
100 < Employment ≤ 500	0,67	0,13	0,43	0,27	0,64	0,40	12 458	53
500 < Employment ≤ 1,000	0,71	0,19	0,48	0,26	0,69	0,37	10 011	14
1,000 < Employment	0,61	0,12	0,48	0,25	0,79	0,40	53 609	17
Employer age								
Age ≤ 1 year (entrant)	1,84	1,79	0,04	0,03	0,02	0,01	585	12
1 < Age ≤ 3	0,56	0,17	0,37	0,19	0,66	0,34	1 353	12
3 < Age ≤ 5	0,73	0,22	0,45	0,26	0,61	0,35	4 299	10
5 < Age ≤ 10	0,52	0,12	0,38	0,20	0,73	0,39	9 055	34
10 < Age	0,64	0,12	0,49	0,26	0,76	0,41	62 625	61
ISIC Rev 4								
4649	0,36	0,14	0,22	0,11	0,61	0,31	3 492	5
5229	0,50	0,06	0,41	0,22	0,82	0,44	1 701	6
6201	0,47	0,17	0,25	0,15	0,53	0,32	4 013	9
6920	0,75	0,09	0,32	0,33	0,43	0,44	2 590	12
7020	0,59	0,27	0,32	0,16	0,54	0,27	3 294	11
8211	0,52	0,14	0,34	0,19	0,65	0,36	16 360	40
8220	0,81	0,11	0,70	0,35	0,87	0,43	18 167	15

2022 Job and Worker Reallocation in Digital Technologies Sector

	Worker Flow Rate	Job Reallocation Rate	Churning Rate		Churning Flow / Worker Flow		# of Workers	# of Employers
			Model 1	Model 2	Model 1	Model 2		
All	0,54	0,16	0,35	0,19	0,65	0,36	30 270	96
Employer size								
Employment ≤ 50	0,96	0,03	0,34	0,46	0,36	0,48	881	40
50 < Employment ≤ 100	0,84	0,48	0,32	0,18	0,38	0,21	926	12
100 < Employment ≤ 500	0,60	0,13	0,44	0,24	0,74	0,39	6 609	30
500 < Employment ≤ 1,000	0,56	0,18	0,38	0,19	0,68	0,34	1 730	3
1,000 < Employment	0,49	0,16	0,32	0,17	0,66	0,34	20 124	11
Employer age								
Age ≤ 1 year (entrant)	1,91	1,84	0,07	0,03	0,03	0,02	291	9
1 < Age ≤ 3	0,50	0,11	0,38	0,19	0,76	0,39	3 642	19
3 < Age ≤ 5	0,91	0,09	0,46	0,41	0,51	0,45	1 136	12
5 < Age ≤ 10	0,56	0,10	0,40	0,23	0,73	0,41	9 186	32
10 < Age	0,50	0,19	0,31	0,16	0,62	0,32	16 015	24
ISIC Rev 4								
6201	0,58	0,16	0,39	0,21	0,68	0,36	10 224	31
6202	0,76	0,14	0,58	0,31	0,76	0,41	2 767	18
6209	0,76	0,19	0,53	0,29	0,70	0,38	483	7
6311	0,57	0,27	0,27	0,15	0,47	0,26	925	5
7310	0,50	0,12	0,36	0,19	0,72	0,38	731	7
8220	0,44	0,15	0,29	0,15	0,66	0,33	4 202	8

2022 Job and Worker Reallocation in Life Sciences Sector

	Worker Flow Rate	Job Reallocation Rate	Churning Rate		Churning Flow / Worker Flow		# of Workers	# of Employers
			Model 1	Model 2	Model 1	Model 2		
All	0,54	0,15	0,35	0,20	0,65	0,36	50 613	82
Employer size								
Employment ≤ 50	0,64	0,17	0,37	0,23	0,58	0,36	295	23
50 < Employment ≤ 100	0,63	0,29	0,33	0,17	0,53	0,27	687	14
100 < Employment ≤ 500	0,68	0,31	0,35	0,19	0,52	0,27	3 618	22
500 < Employment ≤ 1,000	0,66	0,25	0,37	0,20	0,56	0,31	5 452	8
1,000 < Employment	0,50	0,11	0,35	0,20	0,70	0,39	37 651	15
Employer age								
Age ≤ 1 year (entrant)	1,52	1,30	0,20	0,11	0,13	0,07	1 191	6
1 < Age ≤ 3	1,03	0,85	0,18	0,09	0,17	0,09	576	7
3 < Age ≤ 5	0,50	0,18	0,29	0,16	0,58	0,32	2 272	10
5 < Age ≤ 10	0,68	0,11	0,35	0,28	0,52	0,42	5 415	15
10 < Age	0,50	0,12	0,36	0,19	0,72	0,38	41 159	44
ISIC Rev 4								
3250	0,57	0,20	0,35	0,18	0,63	0,18	6 957	50

2022 Job and Worker Reallocation in Other Manufacturing Sector

	Worker Flow Rate	Job Reallocation Rate	Churning Rate		Churning Flow / Worker Flow		# of Workers	# of Employers
			Model 1	Model 2	Model 1	Model 2		
All	0,46	0,03	0,29	0,21	0,63	0,47	17 640	86
Employer size								
Employment ≤ 50	0,55	0,03	0,35	0,26	0,64	0,47	604	36
50 < Employment ≤ 100	0,64	0,18	0,44	0,23	0,68	0,36	541	8
100 < Employment ≤ 500	0,50	0,03	0,29	0,23	0,58	0,47	7 201	30
500 < Employment ≤ 1,000	0,45	0,08	0,30	0,19	0,67	0,41	6 748	10
1,000 < Employment	0,32	0,12	0,21	0,10	0,64	0,32	2 546	2
Employer age								
Age ≤ 1 year (entrant)	1,10	0,79	0,30	0,15	0,28	0,14	470	8
1 < Age ≤ 3	0,59	0,09	0,45	0,25	0,77	0,43	713	9
3 < Age ≤ 5	0,51	0,06	0,45	0,23	0,89	0,44	494	4
5 < Age ≤ 10	0,48	0,03	0,38	0,22	0,80	0,47	2 904	14
10 < Age	0,43	0,02	0,25	0,20	0,59	0,48	13 059	51
ISIC Rev 4								
1030	0,58	0,05	0,46	0,26	0,80	0,45	966	6
2610	0,45	0,07	0,32	0,19	0,77	0,43	4 074	8

Appendix 4

Salary Change Statistics, Life Sciences Sector 2022

		min	max	median	SD	n
Total		-0.842	1.1	0.123	0.243	28,464
Age group						
	18-29	-0.74	1.1	0.134	0.257	13,394
	30-39	-0.842	1.1	0.12	0.262	9,333
	40+	-0.771	1.1	0.101	0.248	5,737
Gender						
	Men	-0.842	1.1	0.126	0.259	14,429
	Women	-0.731	1.1	0.12	0.255	14,035
Reallocation						
	Reallocated	-0.657	1.09	0.163	0.335	2,155
	Retained	-0.842	1.1	0.12	0.25	26,309
Specialization						
	Promoted	-0.657	1.1	0.226	0.327	1,000
	Same specialization	-0.842	1.1	0.12	0.252	27,091
	Deterioration	-0.639	1.08	0.167	0.337	373

Salary Change Statistics, Manufacturing Sector 2022

		min	max	median	SD	n
Total		-0.774	1.1	0.114	0.247	10,526
Age group						
	18-29	-0.581	1.1	0.155	0.262	2,814
	30-39	-0.745	1.1	0.114	0.241	3,864
	40+	-0.774	1.09	0.082	0.239	3,848
Gender						
	Men	-0.774	1.1	0.119	0.253	7,502
	Women	-0.572	1.1	0.102	0.23	3,024
Reallocation						
	Reallocated	-0.757	1.1	0.269	0.353	318
	Retained	-0.774	1.1	0.111	0.242	10,208
Specialization						
	Promoted	-0.515	1.1	0.199	0.321	168
	Same specialization	-0.774	1.1	0.112	0.245	10,282
	Deterioration	-0.474	0.969	0.2	0.305	76

Reallocation in the Life Sciences Sector, 2022

	Reallocated (8%)		Retained (92%)	
	Salary Increase	Salary Reduction	Salary Increase	Salary Reduction
Improved specialization	17%	7%	2%	0%
Same specialization	46%	18%	78%	19%
Deteriorated specialization	8%	4%	0%	0%
Total	2,155		26,274	

Reallocation in the Manufacturing Sector, 2022

	Reallocated (8%)		Retained (92%)	
	Salary Increase	Salary Reduction	Salary Increase	Salary Reduction
Improved specialization	16%	4%	1%	0%
Same specialization	55%	11%	77%	21%
Deteriorated specialization	8%	5%	0%	0%
Total	318		10,146	

Employment by Level of Specialization per Sector, 2021

Specialization Level	Corporate Services	Digital Technologies	Life Sciences	Manufacturing
High	7%	4%	3%	3%
Medium-high	14%	**53%**	16%	7%
Medium	**42%**	13%	4%	5%
Low	**37%**	**30%**	**78%**	**85%**