Exploring gender differences in labor markets from the perspective of the task based approach*

Explorando diferencias de género en los mercados laborales desde la perspectiva del enfoque basado en tareas

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Abstract

Using households survey microdata from Argentina, Brazil, Chile, Colombia, Mexico and Peru, we characterize changes in employment and wages between the mid-2000s and the late-2010s emphasizing the gender dimension from the viewpoint of the task-based approach. We employ surveys from PIAAC-OECD to study the task content of jobs and create an index of routine task content (RTC) of occupations. We document five facts: (i) The proportion of routine tasks is currently higher for women than for men. (ii) The employment structure is considerably more biased towards high-RTC jobs in Latin America than in OECD countries, for both genders. (iii) There was an increase in the employment participation of low-RTC jobs during the period under study, mainly driven by movements in the occupational structure of women, especially the young and middle-aged. (iv) Wage gains were relatively higher in high-RTC occupations, with this pattern more pronounced for men than for women. (v) While there was a modest reduction in the gender wage gap, the decline was stronger in computer-intensive occupations.

Key words: *Wages, Employment structure, Occupations, Tasks, RTC index, Gender, Latin America.*

JEL Classification: *J16, J21, J31, J62.*

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Resumen

Utilizando microdatos de encuestas de hogares de Argentina, Brasil, Chile, Colombia, México y Perú, caracterizamos los cambios en el empleo y los salarios entre mediados de la década de 2000 y finales de la década de 2010, enfatizando la dimensión de género desde la perspectiva del enfoque basado en tareas. Empleamos encuestas de PIAAC-OCDE para estudiar el contenido de tareas de los trabajos y crear un índice de contenido de tareas rutinarias (RTC) de las ocupaciones. Documentamos cinco hechos: (i) Actualmente, la proporción de tareas rutinarias es mayor para las mujeres que para los hombres. (ii) La estructura de empleo está considerablemente más sesgada hacia trabajos de alto RTC en América Latina que en los países de la OCDE, para ambos géneros. (iii) Hubo un aumento en la participación laboral de los puestos de bajo RTC durante el período de estudio, impulsado principalmente por movimientos en la estructura ocupacional de las mujeres, especialmente las jóvenes y de mediana edad. (iv) Las ganancias salariales fueron relativamente más altas en las ocupaciones de alto RTC, con este patrón más pronunciado para los hombres que para las mujeres. (v) Si bien hubo una reducción modesta en la brecha salarial de género, la disminución fue más fuerte en las ocupaciones con uso intensivo de computadoras.

Palabras clave: *salarios, estructura del empleo, ocupaciones, tareas, índice RTC, género, América Latina.*

Clasificación JEL: *J16, J21, J31, J62.*

1. Introduction

The confluence of the roles of men and women in society was a great advance of humanity in the 20th century (Goldin, 2014). However, to achieve gender equality in the labor market there must be changes in the way jobs are organized and remunerated in order to enhance time flexibility and alleviate women from the responsibilities associated with childcare and other unpaid domestic activities (Berniell et al., 2021; Pinto, 2022).

Latin America experienced modest gains in gender equality during the last two decades. Women's labor force participation has grown slowly, especially for married women in disadvantaged households (Gasparini and Marchionni, 2015), and the gender wage gap declined only modestly. The main goal of this paper is to explore gender differences in the evolution of key labor markets outcomes in Latin America between the mid-2000s and the late-2010s, a period of rapid technological change, from the perspective of the task-based

approach (Autor, Levy, and Murnane, 2003; Acemoglu and Autor, 2011).

To this end we employ surveys from the Programme for the International Assessment of Adult Competencies (PIAAC) conducted by the OECD in several countries, including Chile, Ecuador, Mexico, and Peru, to study the task content of jobs and create our own version of the widely used routine task content (RTC) index. We merge the RTC index to employment and wages at the occupation level for different demographic groups in two time periods: the mid-2000s (2003-2005) and the late-2010s (2016-2018). This information is computed using household surveys microdata for the six largest economies of Latin America: Argentina, Brazil, Chile, Colombia, Mexico, and Peru.

The PIAAC includes several questions related to job tasks. We are interested in tasks related to the routine task content of each occupation. Tasks that demand creative thinking, problem solving and person abilities are flexible and more prone to be complementary with new technologies. Instead, tasks that are repetitive or follow a defined pattern are more likely to be codified and substitutable by automation technologies. We consider the main following tasks: (i) managing, supervising or instructing other workers; (ii) planning the activities of co-workers; (iii) confronting and solving complex problems; and (iv) writing articles or reports. All these tasks require a human input, can be performed both in manual and cognitive occupations, and are not codifiable. We document that workers performing these tasks have a higher probability of using a computer at work, which we interpret as partial evidence of complementarity between flexible tasks and technology use.

We find that women are less likely to perform each of the four flexible tasks frequently, even after controlling for individual differences in age, education, computer use at work, country and occupation, which suggests that the current division of tasks in the labor market is characterized by a larger fraction of routine tasks among women than men.[1] In this context, technologies that allow the automation of routine tasks (such as workplace computerization) may alter the task content of certain jobs and partially contribute to reduce the gender wage gap (Autor et al., 2003; Black and Spitz-Oener, 2010). We provide soft evidence of this hypothesis using an (static) instrumental variable approach.

We construct the RTC index at the two-digit occupation level (International Standard Classification of Occupations, version 08). The RTC index captures the fraction of workers in each occupation that do not perform any of the four flexible tasks frequently. The higher the RTC of an occupation the greater the chances of substitutability by automation technologies. Our RTC index is strongly correlated with the abstract, routine and manual task measures traditionally used in the literature (Autor et al., 2003; De La Rica et al., 2020).

[1] Similar findings are reported in Brussevich *et al*. (2018) and Egana-delSol *et al*. (2022). We comment on these papers later on.

We match the RTC index to employment and wages at the occupation level (computed from household surveys) and conduct pooled and country-specific regressions separately by gender, age group (16-24, 25-40, 41-65) and gender-age group cells. We find that between the mid-2000s and the late-2010s there was a relative increment in the employment participation of low-RTC jobs, which was mainly driven by shifts in the occupational structure of women. It was pervasive across all age groups, but the magnitude was stronger for the young and middle-aged women, which suggests than entry patterns of newer cohorts compared to older cohorts are changing towards low-RTC occupations. The largest shifts in the occupational structure of women took place in Peru, Brazil, Argentina and, to a lower extent, Chile. Mexico and Colombia exhibit different patterns.

Wage gains were relatively stronger in high-RTC occupations, and this pattern was more pronounced for men than women. The gender wage gap exhibits a small decline in Mexico, Brazil, Chile, and Argentina, and a modest rise in Colombia and Peru. However, there is a lot of heterogeneity across countries and occupations. We find that the decline in the gender wage gap concentrated in low-RTC jobs. Women relative wage gains materialized mainly in semi-routine occupations such as secretaries and other clerical work, and in flexible jobs such as managers, professionals, and associated occupations in business, science, engineering, health, legal and social fields. Given that most of these jobs are intensive in the use of computers, the finding is reinforced when we instrument the RTC index with computer use intensity. This finding suggests that technological change might partially help to reduce the gender wage gap, especially for women that are able to work in complement with computers and the new digital technologies of the 21st century.

Finally, when contrasting the occupational structure of Latin America with OECD countries, we find that there is a high correlation in the participation of women *within occupations*, which confirms that horizontal gender segregation is a pervasive feature of labor markets across economies with different degrees of development (Rubery and Fagan, 1993; Anker, 1998). In contrast, we document that the employment structure *across occupations* is considerably biased towards high-RTC jobs in Latin America, for both genders. Men in routine jobs work mainly in the primary, construction, manufacturing and transport sectors, and women are over-represented in routine service occupations such as sales, cleaners and helpers. This result warns about the potentially disruptive effect of the ongoing process of technological change on the structure of employment in the near future, especially for unskilled individuals performing routine jobs highly exposed to automation.

Related literature. This paper relates to several strands of the literature on labor economics, technological change and gender inequality. Technology

has been one of the leading explanations for increasing inequality in the last decades and historically. The early literature on skilled-biased technological change assumes that technology is complementary with skilled labor, therefore positively affecting the relative demand and wages of skilled workers (Katz and Murphy, 1992; Bound and Johnson, 1992; Card and Lemieux, 2001). Recent theories argue that the complementarity or substitutability between technology and labor does not occur at the worker skill level but rather at the task level (Autor et al., 2003; Acemoglu and Autor, 2011). Unlike the early literature, these authors assume that computers and automation technologies are more likely to substitute routine tasks performed by workers in the middle of the skill distribution and to complement analytical and interactive tasks most frequently performed by skilled workers, and that they have no predictable impact on routine manual tasks most commonly carried out by unskilled workers. These assumptions lead to the polarization hypothesis, which was successful in rationalizing the changing pattern of labor markets in developed countries since the 1980s, as they characterize by employment and wage gains at both tails of the skill distribution, mainly in service occupations, at the expense of middle-skill workers mostly employed in manual, production and clerical jobs (Autor et al., 2003; Spitz-Oener, 2006; Goos and Manning, 2007; Autor and Dorn, 2013; Michaels et al., 2014; Goos et al., 2014).

However, the story seems to have been different in the developing world, where the evidence in favor of the polarization hypothesis is scant or non-existent (Maloney and Molina, 2016; Messina and Silva, 2017; Das and Hilgenstock, 2018). Developing lag behind high-income countries in many dimensions, being the most obvious income per capita, investment, education, health, infrastructure and institutional quality. The adoption of new technologies has not been the exception. For instance, PIAAC data suggests that on average 35 percent of workers under ages 16-65 report using a computer at work in Latin American countries, while this fraction is 62 percent in OECD members. Other automation technologies that have been expanding in recent decades are industrial robots. East Asian countries lead by far the ranking of robot adoption in manufacturing, followed by Germany, Japan, Sweden, Denmark, US, and many other European countries. Latin America (mainly Brazil and Mexico) occupy the last positions of the list of robot adopters. For example, in 2016 there were on average 74 industrial robots per 10,000 workers globally, and the ratio was close to 5 and 10 in Brazil and Mexico, respectively (data from the International Federation of Robotics). These simple statistics suggest that Latin America is still at an early stage of technology adoption, which might be one of the key reasons that explain the absence of labor market polarization.

Developed countries have also been experiencing a narrowing gap between men and women in labor force participation, paid hours of work, education

and earnings (Goldin, 2014). The reduction in the gender wage gap is visible at least since the 1970s. The leading explanations point to supply side factors related to changes in education and experience that favored women relative to men, and a larger negative effect of de-unionization for men than women (Blau and Kahn 1997, 2003, 2006). Blau and Kahn (1997) argue that rising inequality delayed the progress of women in the labor market. On the demand-side, some authors argue that changes in product demand associated with rising import competition and large trade deficits in the 1980s were associated with a sharp decline in manufacturing employment and a shift towards sectors that are education and women-intensive such as professional and personal services (Murphy and Welch, 1991; Katz and Murphy, 1992). Welch (2000) attributes the closing of the gender wage gap to the expansion in the value of intellectual skills relative to physical skills (or ``brains relative to brawn'') given the assumption that women are more intensive in intellectual skills than men.

Other contributions argue that the adoption of computers is associated with changes in the nature and conditions of work in forms that benefit women over men. Weinberg (2000) presents decompositions of the growth in women employment and cross-industry-occupation regressions suggesting that rising computer adoption can account for over half of the growth in demand for labor of women. Bacolod and Blum (2010) argue that the large increase in the rewards of cognitive and people skills, with which women tend to be well endowed, and a reduction in the price of motor/manual skills account for up to 40 percent of the rising inequality and 20 percent of the closing gender wage gap. Borghans, ter Weel, and Weinberg (2014) argue that technological and organizational changes rise the importance of interactive/people skills in the workplace, affecting the labor-market outcomes of under-represented groups including women.

In the task-based approach of Autor et al. (2003) computers are substitutes for routine tasks. An implication of this assumption is that demographic groups who initially work in jobs with different routine task content will be affected differently by workplace computerization. The model predicts that groups with higher initial routine task intensity will experience faster computer adoption; and that they will face a stronger relative shift away from routine and towards non-routine tasks. Moreover, if one assumes that computer capital and labor are perfect substitutes in performing routine tasks, the declining price of computers translates into declining rewards for routine tasks. Their model also assumes that computers are a relative complement to non-routine analytical and interactive tasks so, computers increase the productivity of workers carrying out these tasks.

Based on this framework, Black and Spitz-Oener (2010) study the changing nature of tasks for men and women to explain the large decline in the gender

wage gap in West Germany between 1979 and 1999, and find that relative task changes explains half of the observed convergence.[2] In particular, the authors show that women experienced a relative increase in non-routine analytical and interactive tasks, which were associated with higher skill levels. Most notably, they find that women routine task intensity in 1979 was much higher than men, that only women experienced a large relative decline in routine tasks, and that task changes were more pronounced in jobs that experienced greater workplace computerization.

We are aware of two papers in the literature conducting exercises comparable to ours. Using the PIAAC survey, Brussevich, Dabla-Norris, Kamunge, Karnane, Khalid, and Kochhar (2018) document that women on average perform more routine tasks than men and that horizontal gender segregation explains most of these differences. The authors estimate that women are at a higher risk of automation than men (11% versus 9%). Using data from the Skills Towards Employment and Productivity (STEP) survey, Egana-delSol, Bustelo, Ripani, Soler, and Viollaz (2022) show that men are more likely than women to perform tasks related to the "skills of the future'': science, technology, engineering and mathematics, information and communication technology, solving problems and management, which poses women at a higher average risk of automation than men (21% versus 19%). Our main contribution compared to these papers is that our findings do not focus solely on computing differences in the routine task content of jobs across genders but also on the comparison of the evolution of the structure of employment and relative wages across occupations in Latin America over time.

The rest of the paper is organized as follows. Section 2 presents a detailed description of the data sources. Section 3 discusses the estimation strategy. All the empirical findings are explained in Section 4. Section 5 concludes. All tables and figures are included in the Appendix.

2. Data

2.1 The Task Content Of Occupations

To measure the task content of jobs we rely on skills surveys microdata from the Programme for the International Assessment of Adult Competencies

[2] In a previous contribution, Spitz-Oener (2006) document that computer adoption relates to a shift from routine manual and routine cognitive tasks toward analytical and interactive non-routine tasks at all levels of aggregation (aggregate, within industry, and within occupation). Other explanations potentially related to the observed changes in tasks are changes in the selection of workers into the labor market, shifts in product demand arising from growing international trade, or shifts in consumer preferences.

(PIAAC) conducted by the OECD in several countries since 2011.[3] The data set includes demographic variables such as age and gender, education level, occupation at the four-digit International Standard Classification of Occupations (ISCO version 08), use of computer at work, adults' competences in crucial information-processing skills such as literacy, numeracy and problem solving, and organizational abilities related to decision-making and teamwork like management and planning. We work at the two-digit level of the ISCO08 for a total of 40 occupations (see Table 1) to get a more precise statistical representation and minimize matching errors across household surveys.

We exploit information for 24 countries.[4] Most PIAAC data covers high-income countries that are members of the OECD. The majority of surveys were carried out in the first round of the programme (2011-2012). The second round (2014-2015) included upper-middle-income economies such as Chile and Turkey, and the most recent wave (2017) covered middle-income countries like Ecuador, Mexico and Peru. We count on information for four Latin American countries: Chile, Ecuador, Peru and Mexico.[5] For simplicity we refer to the remaining 20 countries as high-income countries or simply OECD.

The sample represents individuals between 16 and 65 years old. We count on 71,107 observations which, using national-representative person weights, represent around 310 million workers. Of this total, 13,157 observations correspond to the four Latin American countries (representing about 67 million workers). Performing a separate analysis for each country proves challenging because sample size is relatively small, so in most of the work carried out with PIAAC data we broadly separate across Latin America and high-income countries.

The PIAAC survey includes several questions related to job tasks. We are interested in tasks that allow to define the routine task content (RTC) of each occupation. Tasks that require creative thinking, problem solving and person abilities are flexible and more prone to be complementary with new technologies, whereas activities that are repetitive or follow a defined pattern are more prone to be codified and replaced by automation technologies. We consider the main following questions/tasks: Do you manage or supervise other people? Do you plan activities of other workers? Are you confronted with complex problems? Do you write articles or reports? These tasks are not codifiable, require a

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3 These data are publicly available at https://www.oecd.org/skills/piaac/

4 Although there is data for more countries (35 in total) in 11 of them there is no information on key variables such as occupations classified under the ISCO08. We work with Belgium, Chile, Czech Republic, Denmark, Ecuador, France, Greece, Israel, Italy, Japan, Kazakhstan, Lithuania, Mexico, Netherlands, Peru, Poland, Republic of Korea, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Turkey, United Kingdom.

5 Notably, three out of these four countries were not included in Brussevich *et al.* (2018). This is important for our purposes because we construct an RTC index that is specific for Latin America.

human input and can be performed both in manual and cognitive occupations. Importantly, they are unambiguously related to the job performed and not to characteristics of the working environment, and present a high variability of responses across individuals. These are the main reasons to justify the validity of our index. For each individual in the survey we define a flexibility index F. The index is a dummy variable that is equal to one when the individual replies that he performs at least one of the four tasks often or very often.[6] F has an intuitive interpretation as it represents the percentage of individuals that perform at least one of the main four flexible tasks frequently. See Appendix for more details on PIAAC data.

For robustness we define an additional flexibility index. Flexibility index F_2 takes values between 0 and 1 and captures the percentage of flexible tasks that the individual performs. The index can take values of 0, 1/4, 2/4, 3/4, 4/4 according to how many flexible tasks the worker performs.

Table 2 presents the percentage of workers performing each flexible task, using a computer at work, and the average value of flexibility indexes across all countries and separately for Latin America and high-income countries. It shows that 12 percent of workers report supervising others, 27 percent planning, 31 percent solving problems, and 30 percent producing written output. There is a lower fraction of workers performing these tasks in LAC than in HIC, with differences ranging from 1 p.p. for supervising to 4 p.p. for planning. The F index says that 54 percent of workers in Latin America perform at least one flexible task compared to 59 percent in high-income countries. The F_2 index, which takes into account the intensity of the tasks performed, goes in the same line but has not an intuitive interpretation as F.

Notably, the use of a computer at work is considerably lower in Latin America than high-income countries (35 percent and 62 percent, respectively). A simple regression analysis using these data suggests that differences in formal education and occupational structure between both groups of countries explain less than half of the lag in computer use, while gender and age structure do not seem to play a critical role.[7]

The relatively low use of computers in Latin America may be one of the explanations for the absence of labor market polarization (Maloney and Molina 2016; Messina, Pica and Oviedo 2017; Das and Hilgenstock 2018; Gasparini et al. 2020). It seems that there is much more room for technology adoption in Latin America than it is currently observed. Whether tasks are indeed automatized or not will depend on many inter-related factors such as the price and

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6 Individuals respond with a number between 1 and 5 meaning: 1=never; 2=less than once a month; 3= less than once a week; 4=at least once a week; 5=every day. Our main definition considers replies of 4 and 5 to mean often. Results are very similar when we include option 3.

7 These results are beyond the scope of this paper but are available upon request.

availability of new technologies (and labor), network and capital infrastructure, stock of human capital, credit constraints, government policies, labor market and trade policy regulations and, more broadly, state of the art technology and production methods.

2.2 The RTC Index

For each individual in the PIAAC survey we know the occupation according to the ISCO 08 classification. We use the information related to job tasks to define a routine task content index (RTC_1) at the occupation level, which represents the percentage of workers in each occupation that do not perform any of the four flexible activities often.

That is, for occupation i , the index is defined as

$$RTC_{1,i} = 1 - \frac{1}{n_i} \sum_h F_{1,h} \tag{1}$$

where h are individuals and n is the number of individuals in occupation i . The index captures the percentage of individuals within an occupation that mostly perform routine tasks. A similar approach is used by Autor, Levy, and Murnane (2003) and Autor, Katz, and Kearney (2006, 2008). We analogously define a routine task content index RTC_2 , by computing weighted averages of the individual level flexibility index F_2 .[8]

The lower the RTC of an occupation the higher the possibilities of complementarity with new technologies. The higher the RTC of an occupation the lower the chances of complementarity with new technologies or the higher the chances of substitutability by labor-saving automation technologies. This is not a one-to-one mapping and is not deterministic but provides a clear ranking of occupations that is useful to characterize the temporal evolution and the current state of the labor market structure and the associated wage distribution, enabling international comparability. To construct these indexes we pull together the 24 countries with complete information from the PIAAC surveys to have a more representative sample of workers for each occupation. If we construct the RTC index separately for Latin America and high-income countries the ranking of occupations is very similar (the Pearson rank correlation coefficient is 0.93 and statistically significant at the 99% confidence interval) and all of our results remain valid.

Table 1 presents the complete list of occupations at the 2-digit ISCO08 ordered from the lowest to the highest RTC index. Most of the ranking of occupations is explained by the average education of workers in each occupation

[8] We proceed in a similar manner to compute the abstract, routine and manual task measures from De La Rica et al. (2020); mentioned at the end of this section.

(the pairwise correlation coefficient between the RTC index and education is -0.9). However, it is worth noting that the relation is far from being linear (see Figure 1). The RTC index is around 0.58 for individuals with up to 8 years of formal education. Then this trend decreases gently for individuals with up to 12 years of education and sharply decrease thereafter, reaching a minimum around 0.25 for the most educated individuals. Table 1 also shows the percentage of workers in each occupation that report to be using a computer at work. We classify occupations in three groups taking into account the nature of occupations: (1) Flexible occupations (RTC index ranging from 0.09 to 0.29); (2) Semi-routine occupations (0.36 to 0.58); and (3) Routine occupations (0.66 to 0.78). The first group contains skilled jobs related to professional occupations such as managers, engineers, professors, doctors, lawyers, accountants, which generally perform tasks that involve highly cognitive skills (such as creative thinking and problem solving) and interpersonal abilities (managing, planning, organizing) and, in most cases, demand several years of formal education. The majority of workers in these jobs perform flexible tasks and have the adaptability required to benefit from technological change and work in complement with computers and other recent technologies. Indeed, computer use is very high within this group (86 percent).

The second group encompasses middle-skill occupations related to the provision of services such as nursery, personal care, personal services, security, electricians, repairers, customer services, sales, secretariat. It also include middle skill jobs in manufacturing, construction and transport such as welders, mechanics, builders, machine operators, assemblers, drivers. Most tasks in these jobs require job-specific knowledge, practical experience and, in the case of services, interpersonal abilities. Computer use in this group is medium (0.44) and exhibits a high variability across occupations (being very high for clerical jobs and very low for crafts, drivers, assemblers and builders, which use other tools as complements for their work). Health and personal care jobs seem hardly automatable. The same for jobs related to repairs, electricity and building. There is some room for automation of tasks related to customer services and sales through digital sales platforms, programming, new software. While jobs that are physical, repetitive and risky are prone to be codified and substitutable by machines and robots. In fact, the literature points to many of these occupations as the ones displaced by the automation process that has occurred in developed countries in recent decades, especially in industry and manufacturing (Autor and Dorn 2013; Goos et al. 2014).

The third group contains unskilled occupations in agriculture, industry or services such as day laborers, elementary workers, assistants, street sellers, cleaners and helpers. Most of these jobs involve manual tasks related to essential activities such as cropping and farming, food preparation, cleaning, and

community tasks that are physically intensive and repetitive. Computer use in this group is very low (0.13). In Latin America, these jobs are generally precarious, informal and poorly paid. Although they have a high RTC, the actual risk of automation seems to be moderate because wages are low and a large fraction of individuals in this group are family workers in the primary sector.[9]

For robustness, we follow the approach of De La Rica, Gortazar, and Lewandowski (2020) and compute abstract, routine and manual task measures that are consistent with the previous literature on this topic (Autor et al., 2003; Autor and Handel, 2013). The PIAAC questions used to construct these measures are reported in the Appendix (see Table 3). We find that there is a strong correlation between our measure of RTC and those of abstract and routine task content traditionally used in the literature (see Table 4 and Figure 2). The pairwise correlation coefficients are 0.93 and 0.90, respectively. Our index of RTC also presents a very high correlattion with the RTC index 2 (0.95), the one that takes into account tasks intensity. The RTC index also correlates positively with the index of manual tasks (0.66), which highlights that persons conducting manual tasks are more prone to be substitutable by automation technologies. Importantly, all our regressions are robust to the use of these alternative indexes. For briefness, all of these tables will be presented in a separate appendix of the paper.

2.3 Labor Market Statistics At The Occupation Level

We employ microdata from household surveys for Argentina (*Encuesta Permanente de Hogares*, EPH), Brazil (*Pesquisa Nacional por Amostra de Domicílios*, PNAD), Chile (*Encuesta de Caracterización Socioeconómica Nacional*, CASEN), Colombia *(Encuesta Nacional de Hogares*, ENAHO), Mexico (*Encuesta Nacional de Ingresos y Gastos de los Hogares*, ENIGH) and Peru (*Gran Encuesta Integrada de Hogares*, GEIH) since the early 2000s. We define two periods: mid-2000s (generally 2003-2005) and late-2010s (generally 2016-2018). In most countries we pull together three years of data in each period to increase the precision of our estimates.[10] Household surveys come from the SEDLAC database and have individual information on wages, gender, age, household composition, education, occupation, informality condition, which

[9] The agricultural revolution has occurred many decades ago with the advent of technical advances and mechanization such as seeders and harvesters, crop rotation and, more recently, genetic improvement of seeds, new tillage and storage methods. Recently, the region has experienced a strong advance of the agricultural frontier that was fostered mainly by the boom in commodity prices.

[10] The only exceptions are Chile and Mexico. The CASEN is quite big and generally conducted every three years: we use 2003 and 2017. The ENIGH is conducted every two years: we use 2004, 2006 and 2016, 2018.

we standardize over time and across countries.[11] The data set is a repeated cross-section. We restrict the sample to individuals under ages 16-65.

The period under study begins in this date for various reasons: to avoid the confusing effect of the macroeconomic crises that hit Latin America around the 2000s, to use recent surveys of higher quality and comparability, and to focus on a period of rapid technological change.

In the following exercises the unit of analysis is the occupation, as we match the RTC index computed from PIAAC to labor market statistics for each occupation. We will perform a separate analysis for each country and always use occupation weights to obtain estimates that are representative of the working population in each country. Additionally, we will run separate regressions by gender, age groups (16-24; 25-40; 41-65) and gender-age group's cells.

Table 5 presents the median wage across occupations, the gender wage gap (defined as the median women wage divided by the median men wage in each occupation), the employment share of each occupation, and the women participation in each occupation (women *participation*). Levels are the simple average across Latin America in the most recent years of our sample (late-2010s) and the average change during the period under study (mid-2000s to late-2010s). In all cases we use person weights that vary by country and year (i.e. weights are survey-specific).[12] And employment statistics are computed using the number of hours worked by each worker as reported in the survey.[13]

Descriptive statistics uncover several facts. The majority of workers in Latin America belong to the group of semi-routine occupations (53.9 percent on average), which a priori is the most exposed to automation technologies. This holds also if we separate workers by gender, but it is somewhat more accentuated for men than women (55.7 percent of working men belong to this group while this fraction is 51.3 for women). Salespersons and cashiers is the occupation that employs most workers in Latin American countries (12.5 percent on average across countries). This occupation is more relevant for women than men: 17.9 percent of employed women are salespersons. Other occupations in this group that are relevant for women are personal services (7.5 percent), general clerks and secretaries (4.7 percent), personal care (4.5 percent) and food processing, woodworking, textile and other craft workers (3.5 percent). The second occupation that employs the most workers in this group is drivers and mobile plant operators (7.8 percent on average) and, since these are jobs mainly carried out by men (the share of men is 97.2 percent) this job represents

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11 For more details visit http://www.cedlas.econo.unlp.edu.ar/wp/en/estadisticas/sedlac/

12 We have also computed these statistics separately for each country but tables are not included in the paper to save space (they are available upon request). We will refer to specific country statistics when appropriate.

13 All of our estimates are robust to weight all employed individuals equally, irrespective of the number of hours worked.

12.4 percent of men employment. Other occupations in this group that employ a good fraction of men are sales (9 percent) and building and related trades (8.3 percent). The participation of semi-routine occupations increased in Latin America during the period under study (on average by 3.3 p.p.). There is some heterogeneity across occupations within this group. For instance, there are three occupations that exhibit a decreasing participation in all countries: metal, machinery and related trades workers (-0.5 p.p. on average), handicraft and printing workers (-0.5 p.p.) and food processing, woodworking, textile and other craft workers (-0.8 p.p.). These are occupations that could have been replaced by labor-saving automation technologies. However, the decline in the share of such occupations seems small compared to what has had occurred in developed countries.[14] On the other side, two occupations present a growing trend in all countries: personal services (1.3 p.p. on average) and drivers and mobile plant operators (0.9 p.p.).

Routine occupations represent around a quarter of employment in Latin America in the late-2010s. The participation of this group in total employment is very similar for both genders in all countries except Argentina.[15] There is a large reduction in the employment participation of routine occupations during the period under study (-5.2 p.p. on average). The decrease was generalized across all countries in the sample, across all occupations within this group, and across both genders, except for laborers in mining/construction/manufacturing (which grew on average by 1.1 p.p.). For women, the most important occupation in this group is cleaners and helpers (9.8 percent). The employment share of this job diminishes by 1.6 p.p. For men, agricultural workers and laborers together add to 11.8 percent and exhibit a decline of 2.9 p.p.

The fraction of workers employed in flexible occupations is on average 21 percent. It is lower in Colombia, Mexico and Peru (around 17-18 percent), larger in Argentina and Brazil (about 22 percent) and considerably higher in Chile (29 percent). The fraction of workers employed in this group increased moderately during the period under study (1.7 p.p.). If we separate employment by gender, this group is more relevant for the employment of women than men in all countries (24 percent versus 19.1 percent) and the gap increased in all countries during the period under study (except in Chile).[16] For men, the most important occupations in this group are associate professionals in

[14] Assemblers is another occupation commonly displaced by automation. However, its participation has changed little in Latin America.

[15] In Argentina 17.8 percent of women are employed in routine occupations and this fraction is 12.5 percent for men. The gap was even larger in the mid-2000s.

[16] Chile exhibits the highest fraction of workers employed in this group and this holds for both women and men (which represent 35.5 percent and 24.8 percent of employment for each gender, respectively.). The fraction of men employed in flexible occupations increased by 3.4 p.p. and that of women diminished by 0.4 p.p. during the period under study.

science and engineering (2.7 percent), associate professionals in business (2.6 percent) and production managers (1.9 percent). For women: teaching professionals (5.8 percent), associate professionals in business (4.1 percent) and health professionals (2.6 percent). Notably, production managers exhibit a decreasing participation in all countries (on average -1.1 p.p.). In line with the growing trend of college and university graduates, most professional and associated occupations present a growing trend in all countries, specially in science and engineering (around 1 p.p., including both professionals and associates), health (1 p.p.), legal/social/cultural (0.6 p.p.), business (0.3 p.p.) and teaching (0.2 p.p.).

The participation of women in each occupation in the late-2010s is on average 44.6 percent in flexible occupations, 37.2 percent in semi-routine occupations, and 39.5 percent in routine occupations. There is an increase in women participation in most occupations, which is in line with a growing trend in female LFP. In the first group, the jobs with the largest fraction of women are health and teaching professionals (61.7 percent and 69.2 percent, respectively). Health professionals exhibit a rise in women participation of 10 p.p. Managerial occupations in production, administrative, and services have on average a women participation of 32.3, 42.8 and 38.7 percent, respectively. Women gain participation in managerial positions in administrative and commerce (the average rise across countries was 15.7 percent) and production and specialized services (6.4 percent) and this holds for all countries. Although there is a growing trend in the women share in professional occupations in science and engineering (6.9 percent) they are still very under-represented in this group: representing 25.5 percent of employment for professionals and 15.7 percent for associates. The situation is similar in ICT occupations: the participation of is 18.9 percent for professionals and 13.1 percent for technicians.

For semi-routine occupations, jobs with the largest women participation are personal care (85.8 percent on average), associate professionals in health (72.9 percent), general clerks (71.9 percent) and customer service clerks (64.3 percent). The first three categories present a decreasing trend in the women participation during the period under study, which works in the direction of balancing the disparity in gender composition. On the other side, some occupations in this group are almost entirely dominated by men: building and related trades, electricians and repairers, metal and machinery workers, assemblers, protective service workers and drivers and mobile plant operators. This fact holds in all countries and presents minor changes during the period under study.

For routine occupations, the participation of women increased by 2.5 percent. The share of women is largest for cleaners and helpers (78.3 percent) and food preparation assistants (65.3 percent) and presents little changes during

the period under study. On the contrary, the participation of women is very low in agricultural jobs, laborers and elementary occupations (below 25 percent). Three occupations in this group exhibit a growing trend in the participation of women in all countries: street sales/service workers (6.6 p.p.), agricultural laborers (4.2 p.p.) and industry laborers (4.1 p.p.).

Median wages are on average higher for flexible occupations and lower for routine jobs (the pairwise correlation coefficient between the RTC index and median wage at the occupation level is -0.83 and it is statistically significant at the 99% confidence level). Highest paid occupations are administrative and commercial managers (9 USD per hour at PPP 2011 on average), science and engineering professionals (8.6 USD), and public administration officials (8.5 USD). The lowest paid occupations (below 3 USD per hour) are all categories in the group of routine occupations, and workers in handicraft and printing, crafts, and personal services. Hourly wages in flexible occupations are highest in Chile and Argentina (on average 8.5 and 7.9 USD, respectively), followed by Brazil (6.8 USD), Colombia (5.5 USD), Mexico (5.2 USD) and Peru (4.5 USD). The ranking is similar for semi-routine and routine occupations, but wage differences across countries are lower in these groups than in the flexible category. The percentage change in median wages during the early 2000s and the late 2010s is on average higher for occupations with high-RTC and lower for flexible occupations, and this holds for all countries in our sample. This is in line with the decreasing trend in income inequality that have occurred in Latin America in the 2000s and 2010s. Messina et al. (2016) suggest that currency appreciation triggered by the commodity boom increased the relative demand for workers in the non-traded sector, which reduced returns to education and compressed the wage distribution. There was also a general expansion of minimum wages that mostly benefited low-wage workers. Technological change should have moved relative wages in the opposite direction. If the technology channel had dominated the others, we should have observed larger relative wage gains for flexible occupations (as they use technology more intensively) and lower for routine occupations (which are less complementary or even substitutable by ongoing automation).

Finally, in most occupations the median wage of women is lower than the median wage of men (i.e. gender wage gap coefficient is lower than 1). It is on average 11 percent lower for flexible occupations, 12 percent for semi-routine and 11 percent for routine jobs. In the first group, the gender wage gap is largest for ICT technicians (-20 percent), health professionals (-18 percent), and business professionals and associates (-17/18 percent). In the second group, the wage gender gap is very large for plant and machine operators (-41 percent), handicraft and printing workers (-39 percent), crafts (-24 percent) and sales workers (-23 percent). In the third group, this gap is larger for subsistence

workers in the primary sector (-36 percent) and for agricultural workers and laborers (-21 percent). Gender differences in median wages across occupations in the late 2010s are lowest in Colombia (-7 percent) and Argentina (-8 percent), somewhat higher in Brazil and Chile (-10.3 and -11 percent, respectively) and largest in Mexico and Peru (around -21 percent). Notably, although there is a lot of heterogeneity across occupations within countries, the average gender wage gap decreased for flexible occupations (-5 p.p.) and this holds for all countries. On average, the largest reduction in the gender wage gap occurred in managerial occupations (-13 p.p. for production and administrative managers, and -9 p.p. for services managers), science and engineering professionals (-12 p.p.) and health professionals (-12 p.p.). These occupations are intensive in skills and technology use. Within the semi-routine group, three occupations present a reduction in the gender wage gap in most countries: general clerks (3.2 p.p. on average), customer service clerks (4.2 p.p. on average) and sales workers (3.7 p.p.). All of these jobs are relatively intensive in the use of computers.

3. Methods

3.1 Estimates Of Gender Differences In Job Tasks And Occupational Structure

We begin documenting gender differences in job tasks. To do that we run simple regressions using microdata from the PIAAC surveys. We run the following regression:

$$Task_{ijc} = \beta_0 + \beta_1 Women_{ijc} + X_{ijc}'\beta + \mu_{jc} + \varepsilon_{ijc} \quad (2)$$

where i, j and c index individuals, occupations and countries, respectively. $Task_{ijc}$ is a binary variable that takes the value 1 if the person reports performing the corresponding flexible task often, or 0 otherwise. We consider the main four flexible tasks discussed in the previous section (supervising, planning, solving problems, producing written output) and the flexibility indexes F and F_2. X_{ijc} is a vector of control variables including age, education and computer use at work. μ_{jc} are country-occupation fixed effects and ε_{ijc} is a mean-zero disturbance. We run this regression by OLS pooling the four countries of Latin American.

We also study the non-parametric relation between age and tasks by conducting local polynomial regressions for each flexible task on age, separately by gender.

Secondly, we document gender differences in the employment structure across occupations between Latin America and high-income countries and relate it to our index of routine task content of each occupation. This second analysis is entirely graphical and, like the first exercise, it is conducted using the microdata from the PIAAC surveys.

3.2 Estimates Of Changes In Employment Structure And Relative Wages

We exploit the information from household surveys of six Latin American countries to study the relation between changes in employment composition, relative wages and the gender wage gap, and the RTC index.

To study the changes in the employment structure, we estimate the following regression:

$$\Delta_{t,t+1}\frac{L_{jc}}{L_c} = \beta_0 + \beta RTC_j + \mu_c + \varepsilon_{jc} \tag{3}$$

where L_{jc} is total employment in occupation j and country c (in year t or $t+1$) and L_c is total employment in country c (in year t or $t+1$). Dependent variable is the change in the employment share of each occupation between the mid-2000s and the late-2010s. We always use the hours worked by each worker to compute total employment. The regressor is the RTC index. We run separate regressions for each country and a common (main) regression (pooling the six countries) that controls for country fixed effects and clusters standard errors at the country level. We compute the participation of each occupation in total employment for individuals aged 16-65 using the reported hours of work, separately by gender, age (16-24; 25-40; 41-65) and gender-age groups cells. First we run regressions by OLS. Then, we run regressions by 2SLS using computer use as an instrument for the RTC index.

To study changes in relative wages and gender wage gaps, we estimate the following regression:

$$\Delta_{t,t+1}W_{jc} = \beta_0 + \beta_1 RTC_j + \mu_c + \varepsilon_{jc} \tag{4}$$

where W_{jc} is the change in the log median wage of occupation j in country c. Additionally, we use the change in the gender wage gap as dependent variable. As before, we run OLS regressions with the RTC index as explanatory variable and 2SLS regressions instrumenting this variable with computer use.

Identification. The idea is to predict the variation of the RTC index that is explained by computer use in each occupation, to proxy for the complementarity between flexible tasks and computer use at work. The identification assumption is that computer use affects employment and wages only through

the task content of jobs. This assumption would be problematic if computers affect productivity through mechanisms not related to the task content of jobs (e.g. gender norms or stereotypes).

We exploit the fact that there is a strong negative and statistically significant correlation between the RTC index and computer use across occupations (Figure 3). The Pearson rank correlation coefficient is -0.85 and it is statistically significant at the 99% confidence interval, and the pairwise correlation coefficient is -0.89. This means that workers in occupations with low-RTC (high-RTC) are more (less) prone to use a computer at work. We exploit this correlation to instrument the RTC index with computer use across occupations. The idea is simple. We use the variation in task content across occupations that is explained by differential use of computers at work. These variables are in levels, fixed over time, and only exhibit variation across occupations. They do not vary across countries or over time. What varies in these dimensions are labor market variables that we compute using information from households surveys: wages, gender wage gaps, employment structure across occupations, women participation. We acknowledge that these estimates are not entirely causal, but they allow us to characterize the evolution of the employment structure across occupations and relative wages in a comparable manner for the six largest Latin American economies over the last two decades.

4. Results

4.1 Gender Differences In Job Tasks

Results in this section highlight that women are less likely to perform each of the flexible tasks frequently, even after controlling for individual differences in age, education, computer use at work, country and occupation, which suggests that the current division of tasks in the labor market is characterized by assigning a greater fraction of routine tasks to women than men.

Table 6 presents the estimated coefficients for women and computer use at work, obtained from running regression equation (2). Panels correspond to each flexible task and the F indexes, and columns represent different specifications. All columns control for age and education groups. Estimates in column 1 suggest that women are on average less likely to perform all of these flexible tasks than men within the same occupation. Differential probabilities range from 2 p.p. for writing to 5.9 p.p. for solving problems. Column 2 controls for computer use at work, which is positive and statistically significant, in line with the idea that computers and flexible tasks are complementary, which is the result that we exploit in our identification strategy. Column 3 includes the

interaction of country and occupation fixed effects to control for differences in the structure of occupations across countries. All coefficients remain statistically significant and present little changes. Point estimates suggest that women in Latin America exhibit on average lower probabilities than comparable men of solving problems (-5.5 p.p.), planning (-4.1 p.p.), writing output (-2.9 p.p.) and supervising others (-1.9 p.p.) at work.[17]

Non-parametric relation between age and tasks by gender

We conduct local polynomial regressions for each flexible task on age, separately by gender, and plot this correlation in Panel A of Figure 4. In Panel B we employ the F index. Besides the small sample size of the PIAAC survey, we find that women are less likely to perform all of these flexible tasks than men across the entire age distribution, but this pattern is less pronounced for the youngest cohorts, in line with the idea that youngest cohorts of women are moving towards more flexible (or less-RTC) occupations. As flexible tasks correlate with skills and there is a general trend towards increasing education over time in most countries, the cohort of older workers has on average lower skills and is less prone to perform all of these flexible tasks frequently than the cohort of young and middle-age workers.

We observe an asymmetric inverted U-shape for all flexible tasks and for both genders. The probabilities of performing planning and supervising are initially increasing on age (more rapidly for men), peak around age 30-35 and decrease thereafter. These are activities that reflect changes in the career paths of individuals, as they correlate with experience and job tenure, and they work in the direction of increasing job flexibility over time for a given individual. In the same tone, the chances of solving problems and producing written output grow on age for the youngest (again, faster for men), peak at about age 25-30 and steadily decrease for older cohorts. These activities relate more to individual skills and human capital and need not change much along the career path, thus peaking earlier than planning and supervising. The group of youngest workers (age 16-24) represents early entrants in the labor market and has a lower level of education than individuals who have finished higher education and then join the labor market (presumably around age 25-30). The youngest tend to be employed in repetitive occupations demanding low-skills, while those with tertiary education in occupations demanding cognitive skills and non-routine tasks.

[17] Estimated coefficients for unskilled workers are negative and statistically significant at the 99\% level in all panels across the three specifications, which suggests that workers with secondary education (or below) are less prone to perform flexible tasks than workers with tertiary education: -7.5 p.p. for solving problems, -5.8 p.p. for writing output, -5.2 p.p. for planning and -2.3 p.p. for supervising. Not shown for briefness and available upon request.

The probability of performing at least one flexible task is lower for women than men, and the difference becomes statistically significant around age 25-30. At least two facts explain this pattern. First, men have a higher participation in professional and associated occupations than women and thus exhibit a higher change of performing flexible tasks when they join the labor market after finishing tertiary education (horizontal gender segregation). Secondly, motherhood might play a role in shaping women's career paths reducing the chance of reaching a managerial or top-rank positions (vertical gender segregation).

From now on and up to the following section, we make a comparison between Latin American and high-income countries. Figure 5 plots the probabilities of performing each of the four main flexible tasks frequently across cohorts by gender in high-income countries. It is worth mentioning that these countries have an older population and a higher fraction of skilled workers than Latin America. Additionally, there are more observations for HIC, which increases the statistical power and precision of the estimates considerably. The asymmetric inverted U-shape is much more clear in high-income countries than Latin America (especially for planning and supervising). The probability of performing these tasks is initially increasing on age but more rapidly in high-income than Latin America (in both cases faster for men) and peaks some years later in high-income than Latin America. The gender gap in flexible tasks for younger versus older cohorts seems to have decreased more rapidly in high-income economies than in Latin America, presumably due to women's earlier educational improvements in HIC.

4.2 Gender Differences In Occupational Structure

In this section we compare the occupational structure of Latin America and high-income countries and relate it to the routine task content of each occupation. Results in the current section might be read with caution because the PIAAC samples are small. In all cases, we use person weights to emulate the occupational structure of each country.

That women and men occupy different jobs (horizontal gender segregation) is an stylized fact for almost all countries in the world (Anker, 1998). Men and women also face different career paths within the same occupation (vertical segregation). Both factors seem to explain the gender wage gap, while differences in promotion and access to managerial positions is generally considered as the main cause of gender inequality (Ponthieux and Meurs, 2015). More generally, the causes are biological, historical, cultural and social.

Figure 6 relates differences in occupational structure across Latin America and high-income countries to the routine task content of each occupation, as

defined by the RTC index. The vertical axis represents the difference in the employment share of each occupation between Latin America and high-income countries. Positive (negative) values are occupations employing more (less) workers in Latin America than in HIC. The size of each bubble is the employment share of each occupation in Latin America. The relation is quite clear: employment in Latin America is significantly more (less) concentrated in occupations with high (low) RTC than in high-income countries. Part of this difference is explained by the existing educational and technological gaps between these regions. But the relation holds even after controlling for differences in computer use at the occupation level, education, and age. For instance, occupations that exhibit a high routine task content and employ a large fraction of workers in Latin America are salespersons, cleaners and helpers, crafts, food preparation assistants, unskilled laborers. All these workers together represent about 15 percentage points more employment in Latin America than in high-income countries (17.5 percent of total employment in high-income versus 32.5 percent in Latin America).

To take into account horizontal segregation, Panel B of Figure 7 presents the same comparative relation but separately for men and women. The share of each occupation calculates over the total employment of each gender. The same pattern emerges: a larger fraction of both men and women in Latin America works in occupations with high-RTC. Men in routine jobs work mainly in the primary and industry sectors, presumably performing physical and repetitive manual tasks, and women tend to be employed in service occupations like sales, cleaners and helpers and food preparation assistants. A notable exception is textile manufacturing, which employs a larger fraction of women than men.

Figure 7 (upper graph in panel A) shows that there is a high correlation in the share of women in each occupation between Latin America and high-income countries. So, horizontal gender segregation is a pervasive characteristic of the labor market in both sets of economies. Lower graph in panel B-left shows that the share of women in each occupation in Latin America is not related to the RTC index. While the graph in panel B-right shows that differences in the share of women in each occupation across Latin America and high-income is slightly negative, but this relation is weak and not statistically significant.

Overall, the main message of this section is that the occupational structure of Latin America is considerably biased towards occupations with high routine task content compared to high-income countries, and this holds for both genders.

4.3 Changes In The Employment Structure

In this section we present the results of running equation regression (3), that relates changes in employment composition across occupations and the RTC index. Results are in Table 7. The main finding is that on average there is a relative increase (decrease) of the employment participation of women in occupations with low (high) routine task content. Estimated coefficients present a negative sign for women across all age groups and the magnitude is decreasing on age, which suggests that differences across cohorts are larger in the younger cohorts than in the older cohorts, which is presumably explained by different entry patterns of the youngest generations. The largest shifts in the women occupational structure happen in Peru, Brazil, Argentina and to a lower extent, Chile. Colombia and Mexico present different patterns. The main coefficient for Colombia is negative and it is driven by movements in the employment structure of men towards occupations with low RTC, while the employment structure of women moves in the opposite direction (but coefficients are not statistically significant and standard errors are relatively large). In Mexico, the main coefficient is positive and statistically significant and driven by a relative movement of the employment structure of men towards jobs with high RTC (especially for middle and old-age workers).

These results are reinforced by 2SLS regressions (Table 8). First-stage regressions satisfy by large the weak IV test, as there is a high correlation between the RTC index and computer use (Figure 3). Results show that there is an increase in the magnitude and precision of estimated coefficients, which may be partly explained by the fact that these estimates give less weight to routine occupations in the primary sector (that practically do not use computers) that are mostly carried out by men. In contrast, they give more weight to semi-routine occupations such as secretaries and related clerical jobs that are mostly performed by women, and also to managerial, professional and associated occupations that are intensive in the use of computers and present a relative increase in the employment share of women during the period under study.

We also run similar regressions for the change in the women participation in each occupation. Naturally, in this case we do not separate our estimates by gender because men and women shares are complements. Still, we compute separate estimates by age groups. Tables 9 and 10 present these results. We find that on average the relative rise in women participation is higher for flexible occupations and lower for routine jobs. This result is especially pronounced in Argentina but it also holds for the group of old-age workers in Mexico and Peru.

4.4 Changes In Relative Wages And Gender Wage Gaps

In this section we present the results of running equation regression (3), that relates changes in wages and the gender wage gap across occupations and the RTC index. Results are in Table 11. We find that on average wage gains were relatively higher for routine occupations, and this was much more pronounced for men than women, especially in the middle and senior groups. The estimated coefficient is positive but not statistically significant for women in Chile, Colombia and Mexico. Senior workers in Peru represent an exception (the estimated coefficient is higher for women than men). In contrast, the estimated coefficient for the RTC index is on average higher for women than men in the group of young workers, especially in Argentina, Mexico and Chile.

Results from the 2SLS regressions confirm these findings (Table 12). The magnitude of estimated coefficients for the RTC index slightly increases compared to OLS coefficients, suggesting that different factors related to the routine task content of jobs and their rewards (other than the predictability of the RTC given by computer use) work in the direction of biasing estimated coefficients towards zero.

Finally, Table 13 presents the results of these regressions using the gender wage gap as dependent variable. In line with the above results, in particular, that men exhibit a higher gradient of wage changes on the RTC index than women, we find that the reduction in the gender wage gap was higher for flexible occupations. This was especially pronounced for senior workers in Brazil, Colombia and Argentina, and for middle-age workers in Chile. Results from the 2SLS regressions confirm this finding, and reinforce the idea that relative wage gains for women were more pronounced for workers under ages 41-65. Again, these results are driven by Brazil, Colombia and, to a lower degree, by Argentina and Mexico.

The case by case analysis suggests that reductions in the gender wage gap occurred mainly in semi-routine occupations such as secretaries and related clerical jobs, and also in flexible occupations such as managers, professionals and associated occupations in business, science/engineering, health, and legal and social fields. All of these jobs are relatively intensive in the use of computers. In this context, it seems that technological change could help, at least partially, to reduce the gender wage gap within occupations, especially for educated women that are able to work in complement with computers and the new digital technologies of the 21st century.

4.5 Robustness Exercises

For robustness, we have run the 2SLS regressions using different indexes of

RTC in the right hand side of equations (3) and (4). These indexes are: the RTC index 2 (which is based on the flexibility index 2), and the abstract, routine, and manual task measures from Autor et al. (2003) and De La Rica et al. (2020). Remember that there is a strong correlation our preferred definition of the RTC index and these different measures (see Table 4 and Figure 2).

It is impressive that all of our results remain virtually unchanged when using any of these alternative indexes. For briefness, all of these tables are included in a separate appendix of the paper.

5. Conclusion

In this paper we empirically characterize the recent changes in employment and wages across occupations in Latin America, with a particular focus on the gender dimension from the perspective of the task based approach. We exploit microdata from household surveys for the six largest economies of the region: Argentina, Brazil, Chile, Colombia, Mexico and Peru, around the mid-2000s (2003-2005) and the late-2010s (2016-2018). The data were previously homogenized following the SEDLAC protocol in order to maximize international and intertemporal comparability.

We also employ recent surveys from PIAAC-OECD to study the task content of jobs and create an index of routine task content (RTC) of occupations. Our RTC index has an intuitive interpretation: the fraction of workers in each occupation that do not perform any flexible tasks frequently. Seen otherwise, the RTC index captures the fraction of workers that mostly perform routine tasks. Flexible tasks are (i) managing, supervising or instructing other workers, (ii) planning the activities of co-workers, (iii) confronting and solving complex problems, and (iv) writing articles or reports. All of these tasks require a human input, can be performed both in manual and cognitive occupations, are not codifiable and present a high variability of responses across workers. We show that workers performing these tasks exhibit a higher probability of using a computer at work, which we interpret as partial evidence of complementarity between flexible tasks and technology use, and we exploit this correlation to implement an instrumental variable approach.

We document five facts:

(i) During the period under study there was a relative increase in the employment participation of flexible occupations that was mainly driven by movements in the occupational structure of women, especially the young and middle-aged.

(ii) Wage increments were relatively higher for routine occupations, and this pattern was more pronounced for men than women.

(iii) Women are less likely to perform each of the four flexible tasks frequently, even after controlling for individual differences in age, education, computer use at work, country and occupation, which suggests that the current division of tasks in the labor market assigns a greater fraction of routine tasks to women than men.

(iv) Although there was a modest reduction in the gender wage gap, the decline was stronger for flexible occupations like managers, professionals and clerical jobs. This result is reinforced when we predict the variation in routine task content across occupations with the use of computers at work. We interpret this finding as soft evidence of the idea that technologies that allow the automation of routine tasks (such as workplace computerization) may alter the task content of some occupations and partially contribute to reduce the gender wage gap (Black and Spitz-Oener, 2010).

(v) The employment structure is considerably more biased towards routine jobs in Latin America than in OECD countries for both genders. Men in routine jobs work mainly in the primary, construction, manufacturing and transport sectors, and women are over-represented in routine service occupations such as sales, cleaners and helpers.

The last point warns about the potentially disruptive effects of future automation on the structure of employment, especially for unskilled individuals performing routine jobs that do not use specific machinery for their work.

Our findings reflect that the largest Latin American economies, at their current stage of development, do not exhibit the polarization patterns documented in developed economies. However, we do find evidence in line with the idea that computer use may help to achieve a reduction in the gender wage gap, which is in line with previous findings for developed nations.

References

Anker, R. (1998). Gender and jobs: Sex segregation of occupations in the world. *International Labour Organization*.

Autor, D. H., Levy, F., and Murnane, R. J. (2003). "The skill content of recent technological change: An empirical exploration," *Quarterly Journal of Economics*, 118(4): 1279-1333.

Autor, D. H., and Dorn, D. (2013). "The growth of low-skill service jobs and the polarization of the US labor market," *American Economic Review*, 103(5): 1553-1597.

Acemoglu, D., and D. Autor (2011). "Skills, tasks and technologies: Implications for employment and earnings," *Handbook of labor economics*, Elsevier, vol. 4: 1043-1171.

Bacolod, M., and Blum, B. (2010). "Two Sides of the Same Coin: U.S. "Residual" Inequality and the Gender Gap," *Journal of Human Resources*, 45(1): 197-242.

Berniell, I., Berniell, L., De la Mata, D., Edo, M., and Marchionni, M. (2021). "Gender gaps in labor informality: The motherhood effect," *Journal of Development Economics*, 150, 102599.

Black, S. E., and Spitz-Oener, A. (2010). "Explaining women's success: technological change and the skill content of women's work," *The Review of Economics and Statistics*, 92(1): 187-194.

Blau, F., and Kahn, L. (1997). "Swimming Upstream: Trends in the Gender Wage Differential in the 1980s," *Journal of Labor Economics*, 15: 1–42.

Blau, F., and Kahn, L. (2003). "Understanding international differences in the gender pay gap," *Journal of Labor Economics*, 21(1): 106–144.

Blau, F., and Kahn, L. (2006). "The U.S. Gender Pay Gap in the 1990s: Slowing Convergence," Industrial and Labor Relations Review, 60(1): 45–66.

Borghans, L., Ter Weel, B., and Weinberg, B. A. (2014). "People skills and the labor-market outcomes of underrepresented groups," *Industrial and Labor Relations Review*, 67(2): 287-334.

Bound, J., and Johnson, G. (1992). "Changes in the Structure of Wages in the 1980's: An Evaluation of Alternative Explanations," *American Economic Review*, 82(3): 371-392.

Brussevich, M., Dabla-Norris, M. E., Kamunge, C., Karnane, P., Khalid, S., and Kochhar, M. K. (2018). "Gender, Technology, and the Future of Work," *The International Monetary Fund*, Discussion Note SDN/18/07.

Card, D., and Lemieux, T. (2001). "Can Falling Supply Explain the Rising Return to College for Younger Men? A Cohort-Based Analysis," *Quarterly Journal of Economics*, 116(2): 705-746.

Das, M. M., and Hilgenstock, B. (2018). "The Exposure to Routinization: Labor Market Implications for Developed and Developing Economies." *The International Monetary Fund*.

Das, S., and Kotikula, A. (2019). "Gender-Based Employment Segregation: Understanding Causes and Policy Interventions." *The World Bank*.

De La Rica, S., Gortazar, L., and Lewandowski, P. (2020). "Job Tasks and Wages in Developed Countries: Evidence from PIAAC," *Labour Economics*, 65, 101845.

Dutz, M. A., Almeida, R. K., and Packard, T. G. (2018). "The Jobs of Tomorrow: Technology, Productivity, and Prosperity in Latin America and the Caribbean." *The World Bank*.

Egana-delSol, P., Bustelo, M., Ripani, L., Soler, N., Viollaz, M. (2022). "Automation in Latin America: Are Women at Higher Risk of Losing Their Jobs?," *Technological Forecasting and Social Change*, 175: 121-333.

Gasparini, L., and Marchionni, M. (2015). "Bridging Gender Gaps?: The Rise and Deceleration of Female Labor Force Participation in Latin America." CEDLAS, Center for Distributive, Labor and Social Studies, Facultad de Ciencias Económicas, Universidad Nacional de La Plata.

Gasparini, L., Brambilla, I., Cesar, A., Falcone, G. and Lombardo, C. (2020). "Routinization and Employment: Evidence for Latin America,"

CEDLAS working paper.

Goldin, C. (2014). "A grand gender convergence: Its last chapter," *American Economic Review*, 104(4): 1091-1119.

Goos, M., and Manning, A. (2007). "Lousy and lovely jobs: The rising polarization of work in Britain," *Review of Economics and Statistics*, 89(1): 118-133.

Goos, M., Manning, A. and Salomons, A. (2014). "Explaining job polarization: Routine-biased technological change and offshoring," *American Economic Review*, 104(8): 2509-2526.

Katz, L. F., and Murphy, K. M. (1992). "Changes in Relative Wages, 1963-1987: Supply and Demand Factors," *Quarterly Journal of Economics*, 107(1): 35-78.

Maloney, W. F., and Molina, C. (2016). "Are automation and trade polarizing developing country labor markets, too?." *The World Bank*.

Michaels, G., Natraj, A., and Van Reenen, J. (2014). "Has ICT polarized skill demand? Evidence from eleven countries over twenty-five years," *Review of Economics and Statistics*, 96(1): 60-77.

Messina, J., and Silva, J. (2017). "Wage inequality in Latin America: Understanding the past to prepare for the future." *The World Bank*.

Messina, J., Pica, G., and Oviedo, A.M. (2017). "The Polarization Hypothesis in Latin America: How Demand Forces are Shaping Wage Inequality?," working paper.

Murphy, K. M., and Welch, F. "The Role of International Trade in Wage Differentials," in Workers and Their Wages, M. Kosters, ed. Washington, *DC: The AEI Press*, 39-69.

Rubery, J., and Fagan, C. (1993)}. "Occupational segregation of women and men in the European Community," European Community, *Synthesis report of the network of experts on the situation of women in the labour market*, University of Manchester, Manchester.

Spitz-Oener, A. (2006). "Technical change, job tasks, and rising educational demands: Looking outside the wage structure," *Journal of Labor Economics*, 24(2): 235-270.

Pinto, M. F. (2022). "Stay at Home With Grandma, Mom Is Going to Work: The Impact of Grandmothers' Retirement on Mothers' Labor Decisions," *Economic Development and Cultural Change*, forthcoming.

Welch, F. (2000). "Growth in Women's Relative Wages and in Inequality among Men: One Phenomenon or Two?," *American Economic Review Papers and Proceedings*, 90(2): 444–449.

Weinberg, B. A. (2000). "Computer Use and the Demand for Female Workers," *Industrial and Labor Relations Review*, 53(2): 290–308.

APPENDIX

The PIAAC are the Survey of Adult Skills conducted in several countries by the OECD as part of the Programme for the International Assessment of Adult Competencies. The surveys are publicly available at the OECD-PIAAC website https://www.oecd.org/skills/piaac/.

We base our index definition on the following questions:

- The Supervision task dummy is based on the following two questions. Do you manage or supervise other employees? (Possible answers: 1, 2) (d--q08a). How often does your job usually involve instructing, training or teaching people, individually or in groups? (Possible answers: 1, 2, 3, 4, 5) (f--q02b). The Supervision dummy is defined as positive when the first answer is equal to one, or the second answer is equal to 4 or 5.
- The Planning task dummy is based on the following question. How often does your job usually involve planning the activities of others? (Possible answers: 1, 2, 3, 4, 5) (f--q03b). The Planning dummy is defined as positive when the answer is equal to 4 or 5.
- The Problem solving task dummy is based on the following question. How often are you confronted with more complex problems that take at least 30 minutes to find a good solution? The 30 minutes only refers to the time needed to think of a solution, not the time needed to carry it out. (Possible answers: 1, 2, 3, 4, 5) (f--q05b). The Problem solving dummy is defined as positive when the answer is equal to 4 or 5.
- The Written output task dummy is based on the following two questions. In your job, how often do you write reports? (Possible answers: 1, 2, 3, 4, 5) (g--q02c). In your job, how often do you write articles for newspapers, magazines or newsletters? (Possible answers: 1, 2, 3, 4, 5) (g--q02b). The written output dummy is defined as positive when at least one of the two answers is equal to 4 or 5.

The aggregate routine tasks content index RTC is based on these four dummies. As a previous step to the aggregation across individuals we compute the individual level index F.

SEDLAC DATABASE DETAILS

SEDLAC is a database of socio-economic statistics constructed using official household surveys microdata from Latin American and the Caribbean countries. It is developed by CEDLAS at Universidad Nacional de La Plata and The World Bank's LAC poverty group (LCSPP).[18] We use the SEDLAC

[18] http://www.cedlas.econo.unlp.edu.ar/wp/en/estadisticas/sedlac/

database to obtain information for wages and employment at the occupation level (at the 2-digit of the ISCO08) for all workers in each job and separately by gender, age group, and gender-age group combinations in Argentina, Brazil, Chile, Colombia, Mexico and Peru in two periods of time: the mid-2000s (circa 2003-2005) and the late-2010s (circa 2016-2018). We use person level weights to obtain estimates that are representative of the labor market at the national level.

TABLE A.1

ROUTINE TASK CONTENT (RTC) INDEX AND COMPUTER USE ACROSS OCCUPATIONS

	ISCO08 (2-digits)	RTC index	Computer use
Highly flexible occupations		0.22	0.86
Managers: Production	13	0.09	0.91
Managers: Administrative	12	0.11	0.95
Managers: Services	14	0.16	0.81
Professionals: ICT	25	0.19	1.00
Public administration officials	11	0.19	0.82
Professionals: Business and administration	24	0.20	0.99
Professionals: Science and engineering	21	0.21	0.91
Associate Prof: Science and engineering	31	0.21	0.74
Professionals: Health	22	0.25	0.79
Professionals: Legal, social, cultural	26	0.25	0.85
Associate Prof: Business and administration	33	0.26	0.91
Associate Prof: Legal, social, cultural	34	0.28	0.81
Professionals: Teaching	23	0.29	0.81
Technicians: ICT	35	0.29	0.96
Fairly routine occupations		0.50	0.44
Workers: Protective service	54	0.36	0.43
Workers: Electrical and electronic trades	74	0.36	0.55
Clerks: Numerical/Material recording	43	0.38	0.82
Workers: Personal care	53	0.38	0.46
Associate Prof: Health	32	0.38	0.77
Clerks: Other	44	0.40	0.82
Clerks: Customer service	42	0.40	0.88
Workers: Metal and machinery	72	0.42	0.40

Workers: Handicraft and printing	73	0.47	0.45
Clerks: General, Keyboard, Secretaries	41	0.47	0.96
Workers: Building and related trades	71	0.50	0.21
Workers: Sales and cashiers	52	0.51	0.51
Plant and machine operators	81	0.52	0.33
Workers: Forestry, Fishery, Hunting	62	0.54	0.16
Assemblers	82	0.57	0.35
Workers: Crafts (Food, Wood, Garment, others)	75	0.58	0.24
Workers: Personal services	51	0.58	0.28
Drivers and mobile plant operators	83	0.58	0.23
Highly routine occupations		0.71	0.13
Workers: Agriculture	61	0.66	0.17
Elementary workers	96	0.66	0.29
Laborers: Mining, construction, manuf., transport	93	0.67	0.24
Food preparation assistants	94	0.70	0.09
Street sales and service workers	95	0.70	0.07
Workers: Subsistence primary sector	63	0.74	0.02
Laborers: Agriculture, forestry, fishing	92	0.77	0.06
Cleaners and helpers	91	0.78	0.06

Notes: Data from PIAAC pooled surveys for 24 countries. Sample represents employed individuals between 16 and 65 years old that can be matched to an ISCO 08 occupation. Routine task content (RTC) index is the fraction of workers in each occupation that do not perform any flexible task frequently. Flexible tasks are managing, planning, writing, and solving problems. Computer use is the fraction of workers in each occupation that report using a computer at work. Occupations are ranked from lowest to highest RTC index.

TABLE A.2
FLEXIBLE TASKS, F INDEX AND COMPUTER USE

	All countries (1)	Latin America (2)	High-income (3)
Supervising	0.12	0.11	0.12
Planning	0.27	0.24	0.28
Solving problems	0.31	0.29	0.32
Written output	0.30	0.28	0.30
Using computer	0.56	0.35	0.62
F	0.58	0.54	0.59
F2	0.77	0.76	0.78
Observations	71107	57950	13157

Notes: Data from PIAAC pooled surveys for 24 countries. Sample represents individuals between 16 and 65 years old. Table shows the percentage of workers that that respond "yes'' to performing each flexible tasks often (Supervising, Planning, Solving problems, Producing written output), the fraction of workers using a computer at work, the average flexibility index across individuals (F), and the number of observations, separately for Latin America (Chile, Ecuador, Peru and Mexico) and OECD countries. Calculations are based on employed individuals that can be matched to an ISCO 08 occupation.

TABLE A.3

TASK FRAMEWORK WITH PIAAC DATA

(DE LA RICA, GORTAZAR, AND LEWANDOWSKI, 2020)

Task index	PIAAC questionnaire item	Item no.
Abstract tasks	Face complex problems (< 30 mins)	f_q05b
	Use more advanced math or statistics, or use regression techniques	g_q03h
	Read articles in professional journals or scholarly publications	g_q01d
	Planning the activities of others	f_q03b
	Persuading/influencing people	f_q04a
Routine tasks	Planning your own activities (inverse)	f_q03a
	Organising your own time (inverse)	f_q03c
	Instructing, training or teaching people, individually or in groups (inverse)	f_q02b
	Making speeches or giving presentations (inverse)	f_q02c
	Advising people (inverse)	f_q02e
Manual tasks	Working physically for a long period	f_q06b
	Using skill or accuracy with hands or fingers	f_q06c

Notes: To ensure the reliability of the statistical constructs, all questions provide the same time answers: (i) every day; (ii) at least once a week but not every day; (iii) less than once a week; (iv) less than once a month; (v) never. Source: this table is taken from De La Rica, Gortazar, and Lewandowski (2020).

TABLE A.4

CORRELATION COEFFICIENTS BETWEEN RTC INDEXES

	RTC index	RTC index 2	Abstract	Routine	Manual
RTC index	1				
RTC index 2	0.948	1			
Abstract	-0.924	-0.937	1		
Routine	0.904	0.855	-0.942	1	
Manual	0.658	0.699	-0.746	0.623	1

Notes: This table presents the pairwise correlation coefficients across different RTC indexes used throughout the paper.

TABLE A.5

WAGES AND EMPLOYMENT STRUCTURE BY GENDER IN LATIN AMERICA:
LEVELS (LATE-2010S) AND CHANGES (EARLY-2000S TO LATE-2010S)

	Employment structure (LAC6)						Wages (LAC6)					
	All		Males		Females		Female intensity		Median Wage		Gender wage gap	
	Level	Change	Level	Change	Level	Change	Level	Change	Level	Change	Level	Change
Highly flexible occupations	21.0	1.7	19.1	1.3	24.0	1.9	44.6	3.5	6.4	19.9	0.89	0.05
Managers: Production	1.8	-1.1	1.9	-1.4	1.5	-0.6	32.3	6.4	7.9	27.2	1.05	0.13
Managers: Administrative	1.0	0.3	1.0	0.3	1.0	0.3	42.8	15.7	9.0	12.5	0.92	0.13
Managers: Services	1.7	-0.2	1.6	-0.1	1.8	-0.4	38.7	-0.9	5.1	17.4	0.90	0.09
Professionals: ICT	0.5	0.2	0.6	0.3	0.2	0.0	18.9	-4.2	8.2	4.1	0.94	-0.06
Public administration officials	0.2	0.0	0.3	0.0	0.1	0.0	29.7	2.0	8.5	19.0	0.86	-0.39
Professionals: Business	1.4	0.4	1.3	0.4	1.7	0.5	47.2	4.9	7.5	20.9	0.83	0.05
Professionals: Science and engineering	1.2	0.3	1.5	0.4	0.8	0.4	25.5	6.9	8.6	3.7	0.90	0.12
Associate Prof: Science and engineering	2.0	0.7	2.7	1.0	0.8	0.3	15.7	0.4	4.9	24.9	0.89	0.08
Professionals: Health	1.6	0.5	1.0	0.1	2.6	0.9	61.7	10.0	8.2	1.8	0.82	0.12
Professionals: Legal, social, cultural	1.4	0.2	1.1	0.1	1.7	0.3	45.6	4.8	7.2	20.9	1.01	0.00
Associate Prof: Business	3.2	-0.1	2.6	-0.2	4.1	-0.1	50.0	6.2	5.1	27.4	0.84	0.06

Associate Prof: Legal, social, cultural	1.3	0.4	1.0	0.3	1.9	0.5	45.3	-2.7	4.3	24.7	0.90	0.06
Professionals: Teaching	3.2	0.2	1.6	0.1	5.8	0.0	69.2	1.1	7.2	20.8	0.87	0.00
Technicians: ICT	0.5	0.0	0.8	0.1	0.2	0.0	13.1	-0.7	4.4	24.1	0.80	-0.06
Fairly routine occupations	53.9	3.3	55.7	3.3	51.3	3.8	37.2	1.4	3.2	37.0	0.88	0.00
Workers: Protective service	2.6	0.4	3.7	0.4	0.8	0.4	11.8	5.9	3.7	33.2	1.11	-0.09
Workers: Electrical and electronic trades	0.8	-0.1	1.3	-0.1	0.0	0.0	1.7	-0.4	3.7	36.8	0.93	0.16
Clerks: Data	2.0	0.0	1.9	0.1	2.1	-0.3	37.7	-4.7	3.9	20.1	1.00	0.03
Workers: Personal care	1.9	0.3	0.2	0.1	4.5	0.3	85.8	-2.5	2.8	48.6	0.84	0.12
Associate Prof: Health	1.4	0.5	0.6	0.3	2.5	0.7	72.9	-2.7	4.2	16.9	0.91	0.00
Clerks: Other	0.8	-0.2	0.7	-0.3	1.0	0.1	43.6	12.2	4.2	40.8	0.89	-0.11
Clerks: Customer service	1.5	0.1	0.8	-0.1	2.6	0.1	64.3	6.1	3.3	27.3	0.90	0.04
Workers: Metal and machinery	2.4	-0.5	3.9	-0.5	0.1	-0.1	2.4	-0.6	3.6	40.9	0.94	0.05
Workers: Handicraft and printing	1.2	-0.5	1.4	-0.6	1.0	-0.3	30.0	4.5	2.4	25.9	0.61	-0.03
Clerks: General	2.8	0.8	1.7	0.7	4.7	0.8	71.9	-6.0	4.1	28.5	0.87	0.03
Workers: Building and related trades	5.1	0.2	8.3	0.7	0.2	0.1	1.4	0.5	3.4	49.9	0.98	0.09
Workers: Sales	12.5	0.9	9.0	0.6	17.9	1.1	55.7	3.5	2.7	38.1	0.77	0.04
Plant and machine operators	2.2	0.0	2.5	0.1	1.7	-0.1	31.7	1.9	3.2	32.3	0.59	-0.02

Workers: Forestry, Fishery, Hunting	0.3	-0.1	0.5	-0.1	0.1	0.0	6.9	2.6	2.9	47.3	0.90	0.04
Assemblers	0.5	0.1	0.6	0.1	0.4	0.1	13.9	1.3	3.6	31.3	0.91	0.16
Workers: Crafts	3.1	-0.8	2.8	-0.6	3.5	-1.2	43.1	-0.1	2.7	37.4	0.76	-0.02
Workers: Personal service	5.0	1.3	3.5	0.8	7.5	1.9	55.7	3.4	2.9	41.1	0.89	0.01
Drivers and mobile plant operators	7.8	0.9	12.4	1.8	0.6	0.2	2.8	1.0	3.4	38.1	0.99	-0.14
Highly routine occupations	25.3	-5.2	25.6	-4.7	24.9	-5.8	39.5	2.5	2.5	49.0	0.87	-0.02
Workers: Agriculture	4.4	-0.9	6.1	-1.4	1.8	0.0	15.4	0.8	2.4	56.3	0.79	0.04
Elementary workers	1.9	-1.2	2.3	-1.3	1.2	-0.8	24.1	-1.1	2.9	37.1	0.94	-0.06
Laborers: Mining, construction, manuf., transport	4.5	1.1	6.4	1.6	1.5	0.7	15.9	4.1	2.6	43.2	0.91	-0.06
Food preparation assistants	1.6	-0.5	0.6	-0.1	3.1	-1.0	65.3	2.0	2.6	46.0	0.90	0.01
Street sales and service workers	2.3	-1.0	1.8	-1.1	3.2	-1.0	46.9	6.0	2.3	36.2	0.87	-0.08
Workers: Subsistence primary sector	0.7	-1.2	0.9	-1.1	0.4	-1.3	18.4	-3.1	1.3	92.8	0.64	-0.18
Laborers: Agriculture, forestry, fishing	5.0	-1.3	5.7	-1.5	3.8	-0.7	23.5	4.2	2.5	57.2	0.79	-0.12
Cleaners and helpers	4.9	-0.3	1.7	0.1	9.8	-1.6	78.3	-1.4	2.6	47.8	0.87	0.05

Notes: Statistics computed using household survey data from Argentina, Brazil, Chile, Colombia, Mexico and Peru. In all cases we present the simple average across countries using person weights that are survey-specific. The level of median wages is expressed in constant USD at PPP 2011.

TABLE A.6

DIFFERENTIAL PROBABILITIES OF PERFORMING FLEXIBLE TASKS IN LATIN AMERICA

	(1)	(2)	(3)
Supervising			
Women	−0.020**	−0.018+	−0.019+
	(0.010)	(0.010)	(0.010)
Computer		0.093***	0.094***
		(0.015)	(0.015)
Planning			
Women	−0.047***	−0.047***	−0.041***
	(0.014)	(0.014)	(0.014)
Computer		0.145***	0.146***
		(0.019)	(0.019)
Solving problems			
Women	−0.059***	−0.056***	−0.055***
	(0.015)	(0.015)	(0.015)
Computer		0.096***	0.098***
		(0.019)	(0.019)
Written output			
Women	−0.030**	−0.025+	−0.029**
	(0.014)	(0.014)	(0.014)
Computer		0.205***	0.205***
		(0.019)	(0.019)
Flexibility index F			
Women	−0.064***	−0.058***	−0.060***
	(0.015)	(0.014)	(0.015)
Computer		0.194***	0.195***
		(0.018)	(0.018)
Flexibility index F2			
Women	−0.038***	−0.036***	−0.039***
	(0.012)	(0.012)	(0.012)
Computer		0.096***	0.098***
		(0.013)	(0.013)
Obs.	13157	13157	13157
Occupation FE	Yes	Yes	-
Country FE	Yes	Yes	-
Country x Occ. FE	-	-	Yes

Notes: Data from PIAAC pooled surveys for Chile, Ecuador, Mexico and Peru. Sample represents employed individuals between 16 and 65 years old, whose occupations can be matched to the ISCO 08 classification. All columns control for age and education. Robust standard errors in parenthesis.

TABLE A.7

CHANGE IN THE EMPLOYMENT SHARE OF EACH OCCUPATION (MID-2000S TO LATE-2010S). OLS

	Age 16-65			Age 16-24			Age 25-40			Age 41-65		
	All	Males	Females	All	Males	Females	All	Males	Females	All	Males	Females
Argentina												
RTC index	-0.008	0.005	-0.055***	-0.020	-0.007	-0.114**	-0.009	0.005	-0.065**	0.004	0.008	-0.035***
	(0.006)	(0.008)	(0.013)	(0.012)	(0.011)	(0.048)	(0.009)	(0.009)	(0.028)	(0.006)	(0.008)	(0.008)
Brazil												
RTC index	-0.017	-0.005	-0.065*	-0.038	-0.023	-0.126	-0.023	-0.008	-0.096*	-0.002	0.005	-0.031
	(0.024)	(0.028)	(0.033)	(0.031)	(0.025)	(0.083)	(0.025)	(0.027)	(0.054)	(0.037)	(0.036)	(0.033)
Chile												
RTC index	-0.011	-0.011	-0.050	0.001	-0.006	-0.069	-0.037***	-0.031**	-0.090	0.013	0.005	-0.025
	(0.011)	(0.011)	(0.043)	(0.022)	(0.021)	(0.063)	(0.013)	(0.013)	(0.068)	(0.017)	(0.012)	(0.045)
Colombia												
RTC index	-0.026	-0.045	0.020	-0.064	-0.105	0.100	-0.025	-0.053	0.024	-0.013	-0.026	-0.007
	(0.020)	(0.035)	(0.029)	(0.059)	(0.073)	(0.089)	(0.019)	(0.034)	(0.033)	(0.014)	(0.021)	(0.016)
Mexico												
RTC index	0.028*	0.039*	0.025	0.030	0.031	0.005	0.028*	0.043*	0.020	0.026	0.048**	0.034
	(0.014)	(0.021)	(0.020)	(0.046)	(0.051)	(0.012)	(0.015)	(0.024)	(0.014)	(0.016)	(0.021)	(0.039)
Peru												
RTC index	-0.071**	-0.064**	-0.106***	-0.232***	-0.156	-0.211***	-0.052***	-0.061**	-0.065**	-0.052**	-0.027	-0.087*
	(0.028)	(0.029)	(0.030)	(0.077)	(0.096)	(0.075)	(0.019)	(0.026)	(0.030)	(0.021)	(0.032)	(0.044)
LAC6												
RTC index	-0.016	-0.012	-0.040*	-0.050	-0.041	-0.070	-0.019	-0.017	-0.050*	-0.002	0.003	-0.025
	(0.012)	(0.014)	(0.018)	(0.034)	(0.027)	(0.040)	(0.011)	(0.016)	(0.022)	(0.010)	(0.011)	(0.014)
Obs.	238	238	236	232	230	216	237	237	234	237	237	232
R-squared	0.068	0.036	0.130	0.123	0.061	0.082	0.076	0.041	0.149	0.046	0.031	0.083

Notes: Regressions run at the occupation level. Employment share of each occupation computed using total hours worked. Regressions are weighted by the employment share of each occupation in the mid-2000s. Standard errors are heteroscedasticity-consistent. Last panel pools the six countries, controls for country fixed effects and clusters standard errors at the country level.

TABLE A.8

CHANGE IN THE EMPLOYMENT SHARE OF EACH OCCUPATION (MID-2000S TO LATE-2010S). 2SLS

	Age 16-65			Age 16-24			Age 25-40			Age 41-65		
	All	Males	Females	All	Males	Females	All	Males	Females	All	Males	Females
Argentina												
RTC index	-0.014	0.010	-0.071***	0.003	0.028	-0.130***	-0.015	0.013	-0.083***	-0.011	-0.002	-0.053**
	(0.014)	(0.014)	(0.022)	(0.025)	(0.029)	(0.050)	(0.016)	(0.014)	(0.030)	(0.015)	(0.014)	(0.025)
Brazil												
RTC index	-0.028	-0.015	-0.072**	-0.058	-0.049*	-0.131	-0.034	-0.021	-0.102**	-0.017	-0.004	-0.047
	(0.026)	(0.028)	(0.034)	(0.044)	(0.028)	(0.082)	(0.025)	(0.027)	(0.052)	(0.038)	(0.034)	(0.038)
Chile												
RTC index	-0.016*	-0.010	-0.055	0.006	-0.003	-0.062	-0.043***	-0.037***	-0.092	0.006	0.007	-0.041
	(0.009)	(0.011)	(0.039)	(0.023)	(0.018)	(0.069)	(0.012)	(0.012)	(0.067)	(0.016)	(0.012)	(0.036)
Colombia												
RTC index	-0.025	-0.030	-0.000	-0.063	-0.077	0.026	-0.025	-0.041	-0.002	-0.010	-0.012	-0.004
	(0.020)	(0.033)	(0.020)	(0.049)	(0.067)	(0.039)	(0.019)	(0.033)	(0.020)	(0.015)	(0.023)	(0.020)
Mexico												
RTC index	0.023*	0.032*	0.025	0.021	0.025	-0.002	0.019	0.029	0.020	0.023	0.044**	0.036
	(0.014)	(0.019)	(0.022)	(0.047)	(0.048)	(0.016)	(0.015)	(0.023)	(0.015)	(0.016)	(0.018)	(0.039)
Peru												
RTC index	-0.065**	-0.052	-0.107***	-0.233***	-0.135	-0.245***	-0.041*	-0.052	-0.058*	-0.051**	-0.022	-0.080*
	(0.027)	(0.032)	(0.030)	(0.072)	(0.089)	(0.093)	(0.023)	(0.032)	(0.032)	(0.024)	(0.037)	(0.043)
LAC6												
RTC index	-0.020**	-0.010	-0.049***	-0.052	-0.034	-0.091***	-0.024***	-0.018	-0.058***	-0.009	0.002	-0.033**
	(0.010)	(0.010)	(0.017)	(0.032)	(0.022)	(0.033)	(0.009)	(0.012)	(0.019)	(0.008)	(0.008)	(0.014)
Obs.	238	238	236	232	230	216	237	237	234	237	237	232
R-squared	0.065	0.036	0.125	0.123	0.060	0.076	0.074	0.041	0.147	0.039	0.031	0.079
KP F-stat	1353	737.9	1125	875.8	723.3	1269	974.7	732	1259	1316	732.1	1256

Notes: Regressions run at the occupation level. RTC index instrumented with the percentage of workers using computer in each occupation. Employment share of each occupation computed using total hours worked. Regressions are weighted by the employment share of each occupation in the mid-2000s. Last panel pools the six countries, controls for country fixed effects and clusters standard errors at the country level.

TABLE A.9

CHANGE IN THE PARTICIPATION OF WOMEN IN EACH OCCUPATION (MID-2000S TO LATE-2010S). OLS

	All	Age 16-24	Age 25-40	Age 41-65
Argentina				
RTC index	-0.114***	-0.275*	-0.131***	-0.091***
	(0.027)	(0.155)	(0.047)	(0.026)
Brazil				
RTC index	-0.052	-0.123	-0.039	-0.119
	(0.075)	(0.173)	(0.065)	(0.103)
Chile				
RTC index	0.062	0.052	0.070	0.041
	(0.062)	(0.213)	(0.095)	(0.047)
Colombia				
RTC index	-0.025	0.010	-0.022	-0.038
	(0.049)	(0.048)	(0.058)	(0.052)
Mexico				
RTC index	-0.068	0.038	-0.057	-0.131**
	(0.040)	(0.086)	(0.043)	(0.049)
Peru				
RTC index	-0.008	-0.021	-0.008	-0.117
	(0.030)	(0.070)	(0.053)	(0.077)
LAC6				
RTC index	-0.032	-0.048	-0.028	-0.073*
	(0.026)	(0.048)	(0.027)	(0.030)
Obs.	236	217	235	232
R-squared	0.109	0.127	0.065	0.126

Notes: Regressions run at the occupation level. The participation of women is computed using total hours worked by women over total hours worked by men in each occupation. Regressions are weighted by the employment share of each occupation in the mid-2000s. Standard errors are heteroscedasticity-consistent. Last panel pools the six countries, controls for country fixed effects and clusters standard errors at the country level.

TABLE A.10

CHANGE IN THE PARTICIPATION OF WOMEN IN EACH OCCUPATION (MID-2000S TO LATE-2010S). 2SLS

	All	Age 16-24	Age 25-40	Age 41-65
Argentina				
RTC index	-0.098***	-0.334**	-0.106*	-0.074**
	(0.033)	(0.149)	(0.056)	(0.030)
Brazil				
RTC index	-0.019	-0.018	-0.005	-0.126
	(0.103)	(0.200)	(0.094)	(0.114)
Chile				
RTC index	0.026	0.067	0.036	-0.013
	(0.066)	(0.207)	(0.095)	(0.049)
Colombia				
RTC index	-0.030	0.004	-0.016	-0.056
	(0.054)	(0.052)	(0.064)	(0.054)
Mexico				
RTC index	-0.058	0.064	-0.043	-0.136**
	(0.072)	(0.132)	(0.079)	(0.067)
Peru				
RTC index	-0.017	-0.004	0.004	-0.132*
	(0.035)	(0.081)	(0.056)	(0.074)
LAC6				
RTC index	-0.030*	-0.029	-0.018	-0.088***
	(0.016)	(0.049)	(0.017)	(0.020)
Obs.	236	217	235	232
R-squared	0.109	0.126	0.064	0.124
KP F-stat	1352	834.4	974.2	1342

Notes: Regressions run at the occupation level. RTC index instrumented with the percentage of workers using computer in each occupation. The participation of women is computed using total hours worked by women over total hours worked by men in each occupation. Regressions are weighted by the employment share of each occupation in the mid-2000s. Last panel pools the six countries, controls for country fixed effects and clusters standard errors at the country level.

TABLE A.11

CHANGE IN LOG MEDIAN WAGE OF OCCUPATIONS (MID-2000S TO LATE-2010S). OLS

	Age 16-65			Age 16-24			Age 25-40			Age 41-65		
	All	Males	Females	All	Males	Females	All	Males	Females	All	Males	Females
Argentina												
RTC index	0.433***	0.457***	0.409***	0.361*	0.148	0.498*	0.359***	0.281***	0.419***	0.440***	0.476***	0.318***
	(0.052)	(0.079)	(0.078)	(0.185)	(0.165)	(0.284)	(0.076)	(0.101)	(0.109)	(0.068)	(0.083)	(0.043)
Brazil												
RTC index	0.453***	0.491***	0.340**	0.345**	0.373***	0.420**	0.396***	0.377**	0.382***	0.500***	0.625***	0.420**
	(0.106)	(0.108)	(0.138)	(0.134)	(0.122)	(0.190)	(0.125)	(0.142)	(0.120)	(0.132)	(0.139)	(0.170)
Chile												
RTC index	0.301**	0.446***	0.201	0.255***	0.193	0.245	0.334**	0.461***	0.179	0.407***	0.495***	0.316**
	(0.122)	(0.107)	(0.137)	(0.092)	(0.122)	(0.151)	(0.130)	(0.134)	(0.159)	(0.142)	(0.100)	(0.147)
Colombia												
RTC index	0.380***	0.502***	0.125	0.501***	0.476***	0.352***	0.379***	0.440***	0.240*	0.311**	0.535***	-0.006
	(0.126)	(0.111)	(0.133)	(0.118)	(0.103)	(0.126)	(0.105)	(0.120)	(0.124)	(0.153)	(0.152)	(0.199)
Mexico												
RTC index	0.322**	0.362**	0.292	0.463*	0.270	0.439	0.314**	0.364**	0.361**	0.328**	0.341**	0.368***
	(0.132)	(0.140)	(0.178)	(0.235)	(0.241)	(0.273)	(0.116)	(0.148)	(0.169)	(0.133)	(0.129)	(0.122)
Peru												
RTC index	0.394***	0.374***	0.516***	0.236***	0.357**	0.177	0.351***	0.348***	0.415**	0.323*	0.374**	0.666**
	(0.112)	(0.111)	(0.180)	(0.072)	(0.150)	(0.119)	(0.102)	(0.101)	(0.157)	(0.176)	(0.142)	(0.245)
LAC6												
RTC index	0.380***	0.442***	0.306***	0.361***	0.307***	0.356***	0.357***	0.382***	0.325***	0.392***	0.481***	0.343***
	(0.027)	(0.024)	(0.053)	(0.045)	(0.051)	(0.049)	(0.013)	(0.026)	(0.045)	(0.033)	(0.045)	(0.078)
Obs.	238	238	236	232	230	214	237	237	234	237	237	232
R-squared	0.651	0.676	0.544	0.606	0.433	0.510	0.641	0.637	0.555	0.575	0.608	0.418

Notes: Regressions run at the occupation level. Wages measured in constant 2011 USD (PPP). Regressions are weighted by the employment share of each occupation in the mid-2000s. Standard errors are heteroscedasticity-consistent. Last panel pools the six countries, controls for country fixed effects and clusters standard errors at the country level.

TABLE A.12

CHANGE IN LOG MEDIAN WAGE OF OCCUPATIONS (MID-2000S TO LATE-2010S). 2SLS

	Age 16-65			Age 16-24			Age 25-40			Age 41-65		
	All	Males	Females	All	Males	Females	All	Males	Females	All	Males	Females
Argentina												
RTC index	0.436***	0.484***	0.358***	0.375*	0.176	0.597**	0.409***	0.371***	0.339**	0.436***	0.509***	0.282***
	(0.057)	(0.081)	(0.105)	(0.212)	(0.185)	(0.260)	(0.079)	(0.111)	(0.147)	(0.066)	(0.081)	(0.042)
Brazil												
RTC index	0.568***	0.657***	0.406***	0.514***	0.529***	0.484***	0.504***	0.555***	0.457***	0.616***	0.827***	0.534***
	(0.117)	(0.139)	(0.118)	(0.150)	(0.159)	(0.181)	(0.135)	(0.172)	(0.105)	(0.146)	(0.198)	(0.159)
Chile												
RTC index	0.377***	0.539***	0.236**	0.295***	0.232*	0.289**	0.433***	0.579***	0.272**	0.525***	0.646***	0.387***
	(0.124)	(0.120)	(0.117)	(0.086)	(0.121)	(0.115)	(0.128)	(0.142)	(0.134)	(0.152)	(0.133)	(0.127)
Colombia												
RTC index	0.415***	0.555***	0.141	0.539***	0.548***	0.373***	0.441***	0.497***	0.297***	0.352**	0.580***	0.061
	(0.112)	(0.094)	(0.121)	(0.119)	(0.114)	(0.124)	(0.089)	(0.095)	(0.106)	(0.145)	(0.130)	(0.200)
Mexico												
RTC index	0.359***	0.373**	0.415***	0.580**	0.257	0.635**	0.359***	0.358**	0.516***	0.341***	0.355***	0.435***
	(0.127)	(0.145)	(0.157)	(0.261)	(0.254)	(0.276)	(0.112)	(0.149)	(0.165)	(0.131)	(0.136)	(0.133)
Peru												
RTC index	0.413***	0.393***	0.527***	0.226***	0.363**	0.216*	0.385***	0.393***	0.414***	0.310*	0.365**	0.682***
	(0.119)	(0.126)	(0.178)	(0.067)	(0.163)	(0.112)	(0.110)	(0.121)	(0.158)	(0.175)	(0.152)	(0.230)
LAC6												
RTC index	0.431***	0.507***	0.343***	0.424***	0.359***	0.430***	0.425***	0.466***	0.380***	0.443***	0.559***	0.402***
	(0.031)	(0.041)	(0.048)	(0.053)	(0.061)	(0.060)	(0.020)	(0.037)	(0.036)	(0.048)	(0.070)	(0.072)
Obs.	238	238	236	232	230	214	237	237	234	237	237	232
R-squared	0.648	0.672	0.542	0.603	0.431	0.507	0.636	0.630	0.552	0.572	0.603	0.414
KP F-stat	1353	737.9	1125	875.8	723.3	1269	974.7	732	1259	1316	732.1	1256

Notes: Regressions run at the occupation level. RTC index instrumented with the percentage of workers using computer in each occupation. Wages measured in constant 2011 USD (PPP). Regressions are weighted by the employment share of each occupation in the mid-2000s. Last panel pools the six countries, controls for country fixed effects and clusters standard errors at the country level.

TABLE A.13

CHANGE IN THE GENDER WAGE GAP (MID-2000S TO LATE-2010S). OLS

	All	Age 16-24	Age 25-40	Age 41-65
Argentina				
RTC index	-0.079	-0.070	-0.014	-0.158*
	(0.139)	(0.272)	(0.158)	(0.082)
Brazil				
RTC index	-0.230*	-0.114	-0.131	-0.364**
	(0.121)	(0.140)	(0.085)	(0.158)
Chile				
RTC index	-0.115	-0.409	-0.211*	0.032
	(0.113)	(0.439)	(0.110)	(0.176)
Colombia				
RTC index	-0.109	-0.009	0.048	-0.222**
	(0.080)	(0.221)	(0.085)	(0.094)
Mexico				
RTC index	-0.225	0.167	-0.134	-0.188
	(0.209)	(0.420)	(0.178)	(0.286)
Peru				
RTC index	0.014	-0.094	-0.029	0.185
	(0.153)	(0.123)	(0.161)	(0.211)
LAC6				
RTC index	-0.131**	-0.100	-0.084*	-0.135
	(0.036)	(0.081)	(0.041)	(0.078)
Obs.	236	212	235	232
R-squared	0.079	0.007	0.049	0.046

Notes: Regressions run at the occupation level. Gender wage gap is the ratio of the median wage of men over the median wage of women in each occupation. Regressions are weighted by the employment share of each occupation in the mid-2000s. Standard errors are heteroscedasticity-consistent. Last panel pools the six countries, controls for country fixed effects and clusters standard errors at the country level.

TABLE A.14

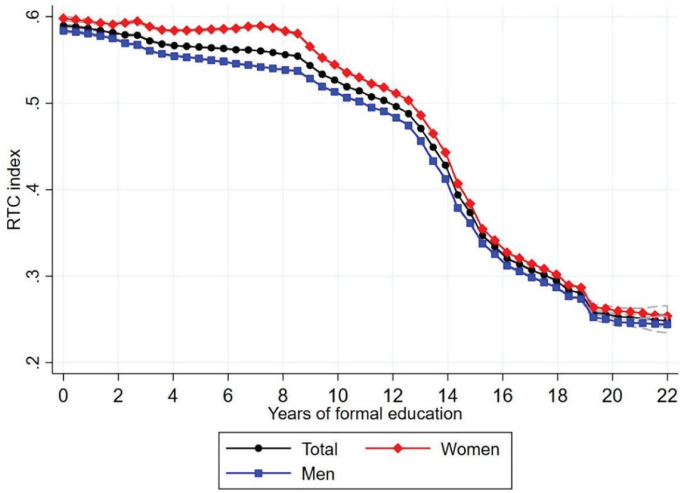
CHANGE IN THE GENDER WAGE GAP (MID-2000S TO LATE-2010S). 2SLS

	All	Age 16-24	Age 25-40	Age 41-65
Argentina				
RTC index	-0.021	0.179	0.083	-0.110
	(0.134)	(0.277)	(0.172)	(0.078)
Brazil				
RTC index	-0.250**	-0.123	-0.123	-0.413**
	(0.119)	(0.129)	(0.089)	(0.163)
Chile				
RTC index	-0.078	-0.372	-0.093	0.001
	(0.149)	(0.497)	(0.158)	(0.200)
Colombia				
RTC index	-0.177*	0.016	-0.035	-0.270***
	(0.092)	(0.198)	(0.092)	(0.103)
Mexico				
RTC index	-0.035	0.481	0.107	-0.192
	(0.256)	(0.460)	(0.271)	(0.280)
Peru				
RTC index	-0.094	-0.051	-0.140	0.009
	(0.170)	(0.135)	(0.180)	(0.203)
LAC6				
RTC index	-0.114***	-0.004	-0.038	-0.172***
	(0.035)	(0.107)	(0.038)	(0.066)
Obs.	236	212	235	232
R-squared	0.079	0.005	0.047	0.045
KP F-stat	1352	841.3	974.2	1342

Notes: Regressions run at the occupation level. RTC index instrumented with the percentage of workers using computer in each occupation. Gender wage gap is the ratio of the median wage of men over the median wage of women in each occupation. Regressions are weighted by the employment share of each occupation in the mid-2000s. Last panel pools the six countries, controls for country fixed effects and clusters standard errors at the country level.

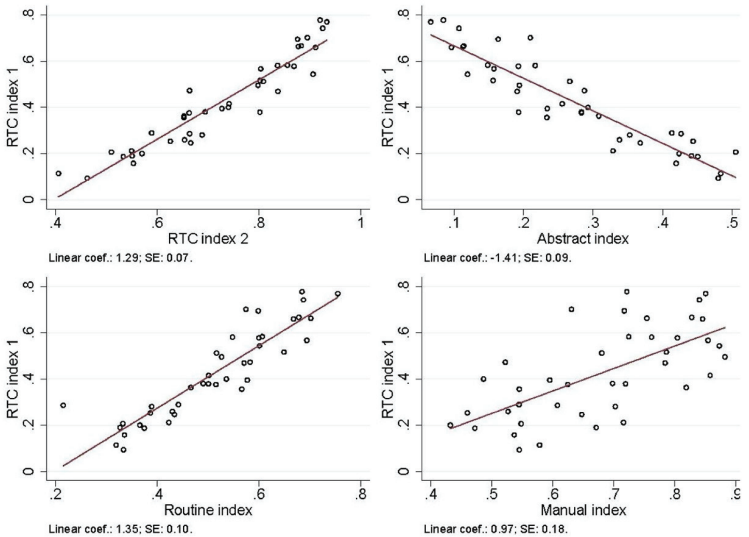
FIGURE A.1

NON-LINEAR RELATION BETWEEN THE RTC INDEX AND EDUCATION



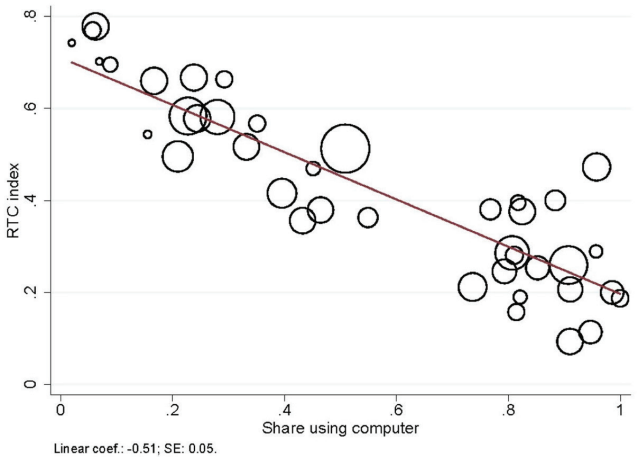
Notes: Data from pooled household surveys for Argentina, Brazil, Chile, Ecuador, Peru and Mexico around the late-2010s. Local polynomial regressions of years of formal education, separately by gender. Dependent variable is the RTC index. The RTC index captures the fraction of workers that mostly perform routine tasks in each occupation. Kernel bandwidth equal to 1. Dotted lines represent 99% confidence intervals (almost invisible given the very large sample size).

FIGURE A.2
CORRELATION BETWEEN RTC INDEXES



Notes: Data from PIAAC pooled surveys for 24 countries. Occupations classified at the 2-digit ISCO08 level (N=40). Each occupation is weighted by its share in total employment (bubbles size).

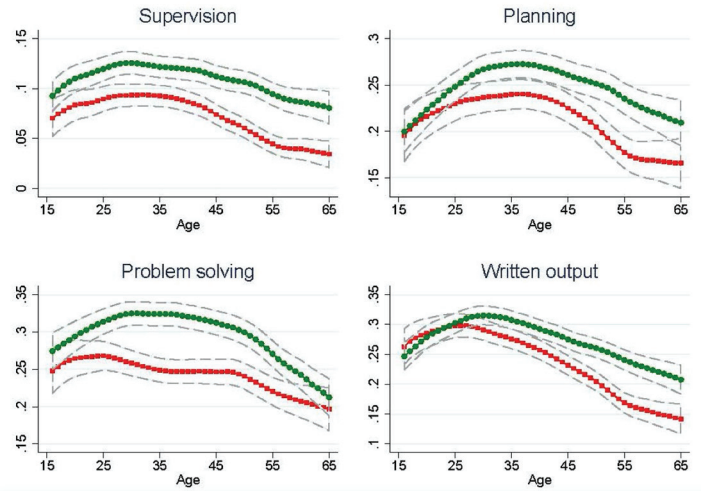
FIGURE A.3
CORRELATION BETWEEN RTC AND COMPUTER USE



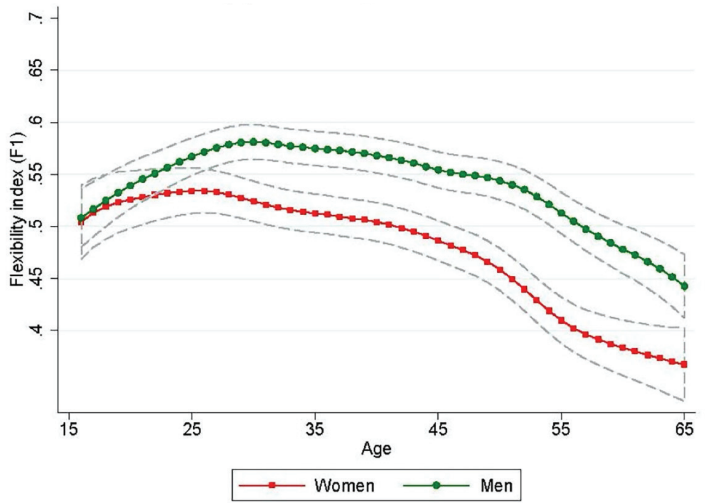
Notes: Data from PIAAC pooled surveys for 24 countries. Occupations classified at the 2-digit ISCO08 level (N=40). Each occupation is weighted by its share in total employment (bubbles size).

FIGURE A.4
PROBABILITY OF PERFORMING FLEXIBLE TASKS ACROSS COHORTS BY GENDER IN LATIN AMERICA

(a) Flexible tasks



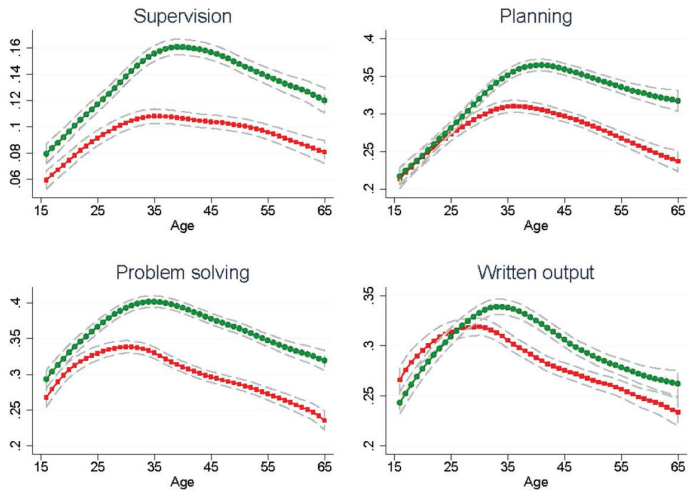
(b) Flexibility index *F*



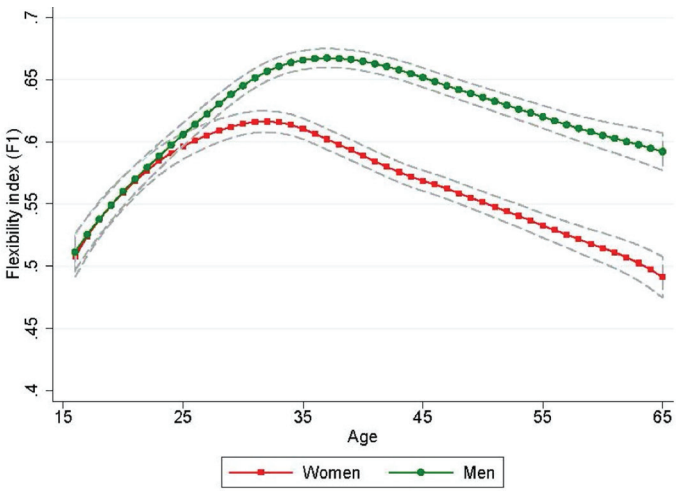
Notes: Data from PIAAC pooled surveys for Chile, Ecuador, Peru and Mexico. Local polynomial regressions of each flexible task on age, separately by gender. Dependent variable in the bottom panel is the flexibility index F. The index is a dummy variable that is equal to one when the individual replies that he performs at least one of the four tasks often or very often. Kernel bandwidth equal to 5. Dotted lines represent 95\% confidence intervals.

FIGURE A.5
PROBABILITY OF PERFORMING FLEXIBLE TASKS ACROSS COHORTS BY GENDER IN OECD MEMBERS

(a) Flexible tasks



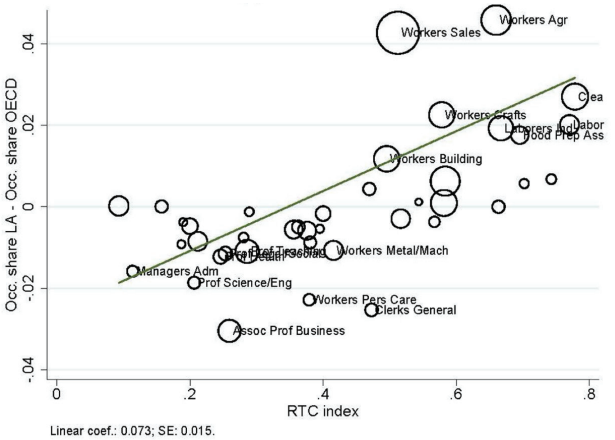
(b) Flexibility index *F*



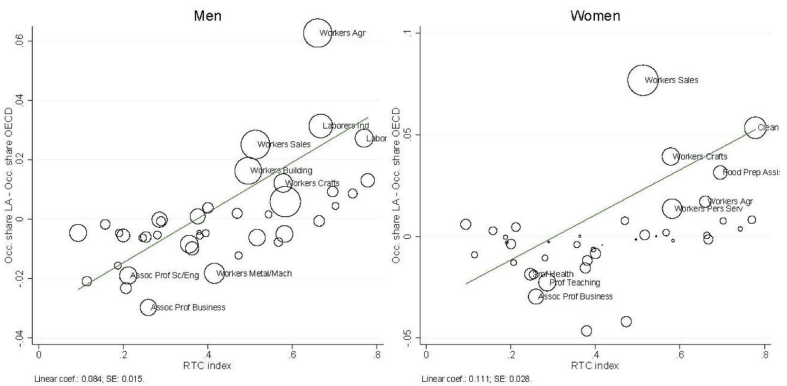
Notes: Data from PIAAC pooled surveys for 20 OECD countries. Local polynomial regressions of each flexible task on age, separately by gender. Dependent variable in the bottom panel is the flexibility index \$F\$. The index is a dummy variable that is equal to one when the individual replies that he performs at least one of the four tasks often or very often. Kernel bandwidth equal to 5. Dotted lines represent 95\% confidence intervals.

FIGURE A.6
DIFFERENCES IN EMPLOYMENT ACROSS OCCUPATIONS AND RTC

(a) All workers



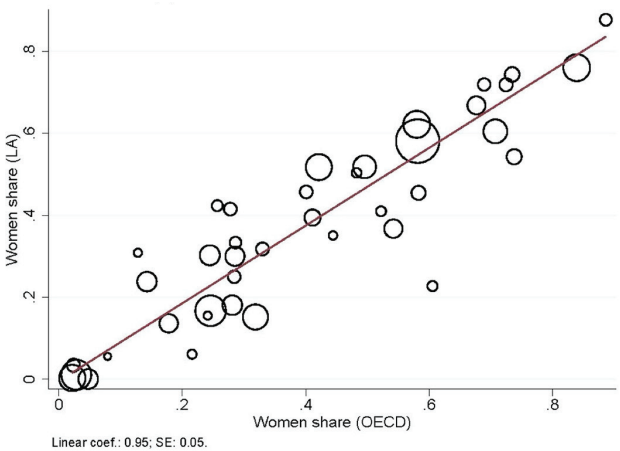
(b) By gender



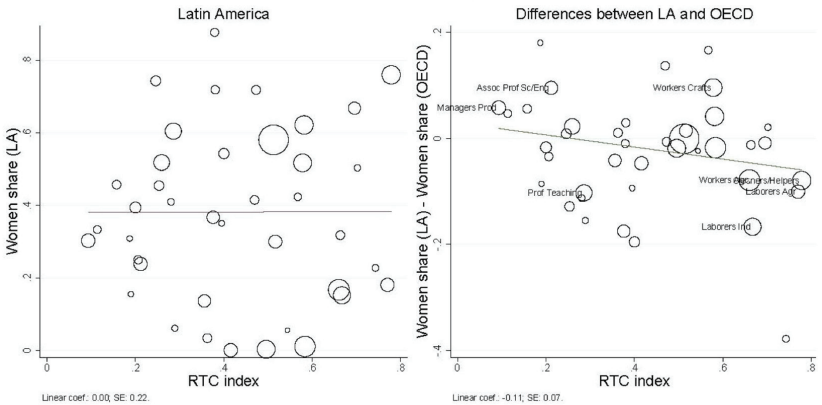
Notes: Data from pooled skills surveys (Programme for the International Assessment of Adult Competencies-PIAAC) conducted by the OECD since 2011. Occupations classified at the 2-digit ISCO08 level (N=40). Panel A depicts the relation between the difference in employment share of each occupation across Latin America (LA) and OECD countries and the RTC index. Weights (bubble size) represent occupation shares in employment in LA. Labels for occupations with employment share above 2.5 percent (which is the equally distributed fraction across 40 occupations) and an absolute difference in employment shares above 1 p.p. In Panel B occupation shares are gender-specific. Weights represent occupation shares for each gender in LA. Labels for occupations with gender-employment share above 2.5 percent and absolute differences in gender-employment shares above 1 p.p.

FIGURE A.7
DIFFERENCES IN THE SHARE OF WOMEN WITHIN OCCUPATION AND RTC

(a) Share of woman in LA and OECD



(b) Share of woman in each occupation and RTC



Notes: Data from pooled skills surveys (Programme for the International Assessment of Adult Competencies-PIAAC) conducted by the OECD since 2011. Occupations classified at the 2-digit ISCO08 level (N=40). Panel A plots the relation between the employment share of women in each occupation across Latin America (LA) and OECD countries. Weights (bubble size) represent employment share of each occupation in LA. Panel B (left) plots the relation between employment share of women and the RTC index. Panel B (right) plots the relation between the difference in the employment share of women across LA and OECD and the RTC index. Labels for occupations with employment share above 2.5 percent and absolute differences in employment shares of women above 5 p.p.