
Employer Voices, Employer Demands, and Implications for Public Skills Development Policy Connecting the Labor and Education Sectors

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Educators believe that they are adequately preparing youth for the labor market while at the same time employers lament the students' lack of skills. A possible source of the mismatch in perceptions is that employers and educators have different understandings of the types of skills valued in the labor market. Using economics and psychology literature to define four skills sets—socio-emotional, higher-order cognitive, basic cognitive, and technical—this paper reviews the literature that quantitatively measures employer skill demand, as reported in a preference survey. A sample of 27 studies reveals remarkable consistency across the world in the skills demanded by employers. While employers value all skill sets, there is a greater demand for socio-emotional skills and higher-order cognitive skills than for basic cognitive or technical skills. These results are robust across region, industry, occupation, and education level. Employers perceive that the greatest skills gaps are in socio-emotional and higher-order cognitive skills. These findings suggest the need to re-conceptualize the public sector's role in preparing children for a future labor market. Namely, technical training is not equivalent to job training; instead, a broad range of skills, many of which are best taught long before labor market entry, should be included in school curricula from the earliest ages. The skills most demanded by employers—higher-order cognitive skills and socio-emotional skills—are largely learned or refined in adolescence, arguing for a general education well into secondary school until these skills are formed. Finally, the public sector can provide programming and incentives to non-school actors, namely parents and employers, to encourage them to invest in the skills development process. JEL codes: J23, J24

Recent years have seen a rethinking of the nature of, and measurement of, skills related to labor market success, which increasingly draws on concepts developed in the psychology literature. Traditionally, the economics literature has focused on “years of schooling” as a proxy for these skills, but [Hanushek and Woessman \(2008\)](#) argue that this approach suffers from serious measurement error and should be discarded in favor of exploring the role that particular skills play in driving labor market outcomes.¹ James Heckman and others parse the concept of “skills” into “cognitive” skills—such as knowledge, comprehension, and critical thinking—and “non-cognitive” skills, roughly defined as personality traits and socio-emotional behaviors.² This distinction is increasingly relevant in the context of modern labor markets where jobs increasingly involve non-routine analytical tasks that require problem-solving, emotional intelligence, logic, and teamwork, rather than traditional routine manual tasks ([Acemoglu and Autor 2011](#); [Autor 2013](#); [Aedo et al. 2013](#); [World Bank 2015](#)).³

At the same time, emerging evidence suggests that schools are not teaching the skills that labor markets need. A 37-country study reports that about one-third of the 35,000 employers interviewed have trouble finding workers with the right skills ([Manpower 2010](#)). [Mourshed et al. \(2012\)](#) interviewed nearly 3,000 employers and 1,000 education providers in nine countries, and reports that 42% of employers believe that graduates are prepared for the labor market as compared to 72% of educators. While the recurring shortfall in cognitive skills as measured, for instance, by PISA scores, has been convincingly documented, an emerging body of literature suggests that we must cast the skills net wider. [Shivpuri and Kim \(2004\)](#), for instance, find that U.S. employers report that they most value interpersonal skills, followed by trustworthiness, leadership, and perseverance, while educators identify “knowledge” as the most important skill.

In light of these emerging views, this paper systematically reviews the evidence on the skills demand profile of employers in developed and developing countries, with the objective of informing education and training policy.⁴ Specifically, the paper reviews 27 studies that explicitly ask employers to provide their ranking of the most important skills for their workforce, and to provide a ranking of the skills that are most lacking. The paper then utilizes a developmental psychology framework to recommend shifts to public policies and programs to bring the supply and demand for skills closer together.

Skills for the Labor Market: Concepts and Definitions

Following the literature on economics, as well as on behavioral, personality, and industrial and organizational (IO) psychology, we classify labor-market related skills into two groups: cognitive and socio-emotional.⁵ The American Psychological

Association (APA) defines cognitive skills as the “ability to understand complex ideas, to adapt effectively to the environment, to learn from experience, to engage in various forms of reasoning, to overcome obstacles [through deliberate thinking],” (Neisser et al. 1996). This definition includes intelligence, reasoning, information-processing, perception, memory, literacy, numeracy, and learning, among others. Within cognitive skills, we define three sub-sets for the purposes of this paper: basic cognitive, higher-order cognitive, and technical.

Basic cognitive skills encompass fundamental academic knowledge and comprehension, including literacy and math, and are strongly correlated with labor market success.⁶ Studies that use longitudinal data from the US to regress labor force variables of young adults on cognitive test scores collected while the sample was in high school, find that a one standard deviation increase in a mathematics test score in 12th grade is correlated with 10–15% higher annual earnings by the mid-twenties to early thirties (Mulligan 1999; Murnane et al. 2000; Lazear 2003). Similar results are found for the UK (McIntosh and Vignoles 2001) and Canada (Finnie and Meng 2001). Using literacy scores and labor force behaviors from the International Adult Literacy Survey (IALS), Hanushek and Zhang (2009) finds that a one standard deviation increase in literacy scores increases earnings by 9.3% in a 13 country sample.⁷ A small set of papers find an impact of cognitive skills on wages in developing countries as diverse as Ghana (Glewwe 1996), Kenya (Knight and Sabot 1990), Pakistan (Alderman, Behrman, Ross and Sabot 1996), and South Africa (Moll 1998). These skills are the core of school curricula and are applicable across a wide range of professions.

Higher-order cognitive skills encompass the capacity to deal with complex information processing and are aligned with the emerging non-routine job tasks noted above. These tasks include such abilities as critical thinking, application of knowledge, analysis, problem solving, evaluation, oral and written communication, and adaptive learning (Bloom et al. 1956). An emerging body of literature shows that these skills drive labor market outcomes across a wide-range of occupations (Herrnstein and Murray 1994; Hanushek and Woessmann 2008). For example, Gottfredson (1997) argues that reasoning, problem solving, and decision-making are among the most powerful predictors of overall job performance. These skills are often not included in traditional school curricula (Pina et al. 2012).

Technical skills can be defined as the specific knowledge required to carry out an occupation, and are often equated with “job skills” in policy circles. Such skills might include the ability to repair a car’s muffler, being able to identify specific bacteria under a microscope, or the know-how to sew dozens of shirts per hour. While the definition of technical skills overlaps with that of basic- and higher-order cognitive skills, they merit separate treatment in a policy-oriented paper in order to test the assumption that they alone are synonymous with job-skills, and to provide insights for refining job training policy.⁸ A review by Betcherman et al. (2007) of

job training programs across the world finds, at best, positive returns to technical training for women and, in some cases, youth. More commonly, technical training programs yield zero, or negative rates of return, the latter indicating that more valuable skills would have been acquired if that person had spent her time working rather than in a training course.⁹ These skills may be included in the school curriculum, or may be taught through vocational and technical training programs or institutes.

Socio-emotional skills, the second broad group of labor market-related skills, are behaviors, attitudes, and traits that are necessary complements to cognitive skills in the production process. These skills include such diverse concepts as grit to finish a job, working in teams, commitment, creativity, and honesty.¹⁰ A review of meta-evaluations, reported in [Almlund et al. \(2011\)](#), confirms a significant correlation between job performance and openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism.¹¹ Individual studies find conditional correlations between socio-emotional skills and wages ([Heckman and Rubenstein 2001](#); [Kern et al. 2013](#); [Mueller and Plug 2006](#); [Heckman, Stixrud, and Urzúa 2006](#)), professional success ([Duckworth et al. 2007](#)), absenteeism in the work place ([Stormer and Fahr 2010](#)), and a range of other labor force outcomes.¹² In fact, these skills may be more important than cognitive skills for employment outcomes, especially among low-skilled occupations ([Bowles, Gintis, and Osborne 2001](#); [Mueller and Plug 2006](#); [Carneiro, Crawford, and Goodman 2007](#); [Kniesner and ter Weel 2008](#)). These skills are not commonly a part of the standard school curriculum ([Pina et al. 2012](#)).

While this evidence may convincingly signal that a range of cognitive and socio-emotional skills are important for labor market success, it is not likely to capture the employer perspective for a few reasons. First, supply-side surveys measure only a small set of pre-defined skills, thereby potentially missing the skills that employers most value. Second, the supply-side data measure the skills that the current labor force has, thereby not capturing skills that may not be available, but may be important for the production process. This points to a need to complement the existing literature with demand-side data measuring the skills that employers want and the extent to which these skills demands are met by the current education and training systems.

Data

This paper draws from the published literature across a range of fields. Each data point represents the statistical finding of a paper that summarizes raw data from employer surveys, most of which were specialized surveys collected for the purpose of understanding employer skill needs.

Using a large set of key words related to employer demand for skills, we search five databases to build our sample: Google Scholar,¹³ IDEAS-RePEc,¹⁴ EconLit,¹⁵ ERIC (Education Resources Information Center¹⁶), and PsyContent.¹⁷ In addition,

we consult the publications of institutions dedicated to research in the education field such as the National Center on Education and the Economy (NCEE) and the International Association for the Evaluation of Educational Achievement (IAE). We follow a snowball approach by searching the citations of relevant papers we found in the demand-for-skills literature, using a similar approach to improve the key words list.

We select the studies to be included in the sample based on four criteria. First, we limit the sample to studies published from 2000–2015 in order to capture those skills that are likely relevant for today’s policymakers while providing a sufficiently large sample of studies from various countries to carry out the meta-analysis.¹⁸ Second, we only include studies that present results that summarize empirical data collected from employers, thereby excluding studies based on expert opinion or qualitative assessments. We make one exception by including an analysis of the US O*NET (Casner-Lotto and Barrington 2006), which tabulates data provided by workers. Third, we limit the sample to studies that ask employers to rank the demand for, or difficulty in acquiring all four of, our broad skills sets—basic, higher-order, technical, and socio-emotional—in order to provide a preference ranking across the skill sets. Studies that do not provide a ranking or do not disaggregate within these broad skills sets are included in the discussion but not in the statistical meta-evaluation (Bassi et al. 2012; Burnett and Jayaram 2012; IFC 2011). Fourth, we attempt to ensure a reasonable level of comparability in the structure of the questions across the sample.

Our approach yields a sample of 27 studies drawn from data from dozens of countries. The sample includes two global studies (9 countries in Mourshed et al. 2012, 40 countries in Andreasson 2009), three studies from Western Europe (all in the UK), five from Eastern Europe (Romania, Russia, Macedonia, Poland, and Kazakhstan), five from Latin America and the Caribbean (St. Kitts, Peru, Mexico, and two that survey employers in several LAC countries), six from South/East Asia and the Pacific (India, Pakistan, Indonesia, Vietnam, Tonga, Solomon Islands), four studies from the United States, and one each from Africa (Botswana) and the Middle East (Lebanon).¹⁹ About half the studies select a nationally representative sample, stratifying by firm size, industry, or other characteristics, while others use ad hoc sampling methods such as drawing a sample from another survey (World Bank 2012; Shivpuri and Kim 2004; and Beneitone et al. 2007) or over-sampling specific types of workers (Bassi et al. 2012 and CIDAC 2014 focus on youth-oriented industries; Burrus et al. 2012 selects higher-skilled occupations). The sample principally draws from small, medium, and large firms operating in the formal sector, while a few include a sizeable number of micro-firms (Martin et al. 2008; Hamid et al. 2011; Rutkowski 2010). A wide range of industries are represented, though the manufacturing sector is over-represented. While most of the studies ask employers about their entire labor force, some ask employers to focus on certain groups, such

as youth (Mourshed et al. 2012; CBI 2012; Martin et al. 2007; Close 2012; IFC 2011; Shivpuri and Kim 2004) or new recruits (Casner-Lotto and Barrington 2013; Zemsky 1997).

Due to our selection criteria, the questions of interest are similarly structured across the sample. Twenty four studies ask employers to identify the most important skills that they need in their employees, either by asking an open question or by providing a list of pre-determined skills, and to rank the skills they listed in order of importance. We refer to the results from these studies as the “priority ranking” of the most important skills. Fifteen studies measure the most important skills gaps. Employers are asked which skills are most lacking and to rank them according to how large the perceived gap is. We refer to the results of these studies as the “gaps ranking”. Each study present rankings for all employers in its sample, and a few also disaggregate rankings by industry, occupation, or worker education level.

The broad range of countries potentially represent different labor market characteristics and institutions. This could complicate comparisons if different results emerge in different kinds of labor markets. However, the findings of the studies in our sample are quite similar, suggesting robust patterns that cut across labor market structures.

The skills reported in the studies in our sample are stated preferences rather than revealed preferences, but several studies suggest that there is a strong overlap between the two. Globally, employers are increasingly using headhunter firms and IO psychologists to design and administer skills tests for hiring and promotion (Salgado et al. 2001); the tests typically include the four broad skills sets that we have defined for this paper. Since employers pay IO psychologists to administer these tests, we may assume that the measured skills are valued by the employer. A comparison of a survey to assess employer skill demand and the hiring tests used by headhunters finds a significant overlap between the two surveys (CIDAC 2014). Coming at the question from a different angle, the US O*Net, which asks employees to assess the degree to which they use different skills in nearly 1,000 professions, reports the use of skills classified in all four of our broad skill sets (Burrus et al. 2013), thereby demonstrating that skills actually used on the job are quite similar to those measured in the employer demand surveys used for this paper.

The skills that employers value, as reported in the studies in our sample, are closely matched to those that they attempt to detect when hiring, whether for low- or high-skilled workers. Referring back to the IO psychology literature, hiring tests are regularly administered to potential new low- and high-skilled workers (Salgado et al. 2001). Further, a review of the skills posted on a Ukrainian public job-search site reports that socio-emotional skills are required of low- and high-skilled jobs, while technical skills are only specified for more skilled jobs (World Bank *forthcoming*). This is consistent with Osterman (2001), who concludes that employers of low-skilled workers in the US particularly depend on socio-emotional skills, which

are congruent with low-paid service jobs, given the very low technical demands of the job, while employers of higher-skilled workers put greater emphasis on establishing technical skills, although employers seek IO psychology testing in all three skill sets (Anderson 2001). While socio-emotional and higher-order cognitive skills may be difficult to assess, particularly in low-skilled workers, this may be where first impressions in the interview and employer preference for those with work experience play a role.²⁰

Employer responses are qualitative and not quantitative, so while we know which skill is most important and which skills gap is more pressing, we do not know how much more important a skill is as compared to a skill ranked just below it (Rutkowski 2010). To address this, we not only present the skill that is rated as the most important for each study, we also consider the second-most important skill and the five most important skills (those ranked first through fifth). We report the first, second, and top five ranked skills gaps as well.

When employers identify the most important skill, they may not consider skills that are crucial to the production process, but are abundant in the work force. Since these skills are not used as a selection mechanism when hiring, assigning wages, or awarding promotions, they may be inadvertently forgotten by those being surveyed. To ensure that employers are not only reporting skills gaps, several of the surveys differentiate between the most important skill and the most important skill gap. Results presented below find that the results are, indeed, different.

Methodology

To identify those skills most demanded by employers and the biggest skills gaps, we first map the skills identified in each study into one of our four broad skills sets, $s = \{\text{basic cognitive, higher-order cognitive, technical, and socio-emotional}\}$, as defined in table 1.^{21,22} We then calculate the share of studies $n = 1, \dots, N$ that identify s , for rank r

$$\frac{\sum_{n=1}^N s_n = s|_{r,s}}{N}. \quad (1)$$

We start with $r = 1$ and then repeat the exercise for the second, third, fourth, and fifth priority rankings ($r = 1, \dots, 5$), giving us a matrix of skill set-ranking cells.²³ Finally, we calculate the frequency that each skill set is listed in the top five. Since employers can select any skill for any r , the same broad skill set s may appear several times in the top five ranking. We repeat the exercise with employer rankings of the biggest skills gap.

Table 1. Classification of Skills Reported in the Sample

Socio-emotional	Higher-order cognitive	Basic cognitive	Technical
Adaptability	Analysis skills	Basic literacy	Advanced IT
Collaboration	Critical thinking	Numeracy	Advanced vocational
Commitment	Decision-making		Basic vocational
Control emotions	Entrepreneurship		Business awareness
Conscientiousness	Foreign language		Capable
Cooperation	Innovation		Computer literacy
Creativity	Intellect		Degree level
Conflict aversion	Language		Degree subject
Cultural diversity	Learning processes		Education level
Customer awareness	Listening skills		Experience
Customer care	Manage risk		Grades
Dependability	Oral communication		Hands-on training
Detail-oriented	Organization		Industry-based skills
Efficiency	Planning		IT knowledge
Emotional stability	Problem-solving		Job-specific skills
Enterprising	Strategic management		Office administration
Extraversion	Time management		Practical knowledge
Flexibility	Thinking skills		Professional skills
Hard worker	Written-communications		Score on employer test
Honesty			Statistical analysis
Initiative			STEM
Independence			Technical skills
Integrity			Theoretical training
Leadership			University attended
Modesty			Work experience
Motivation			
Negotiating			
Negotiate conflict			
Networking			
Open to new ideas			
Perseverance			
Personal appearance			
Positive attitude			
Proactive			
Punctuality			
Professionalism			
Responsibility			
Self-confidence			
Self-management			
Social values			
Stress-management			
Teamwork			
Work ethic			

Results are presented in three ways. First, the broad skills sets corresponding to the five most important skills listed in each of 24 studies are discussed. Second, the skill set that was ranked as most important is presented, as well as a discussion of the skills underlying those broader sets. Finally, the second-most important skill set is briefly noted. We also compare the priority skills demanded by employers in different regions, industries, occupations, and by worker education level. We repeat this exercise using data from the 15 studies that measure the greatest skills gaps: presentation of the five greatest skills gaps, the most important skills gap, the second-most important skill gap, and a comparative discussion by region and occupation.²⁴

Results

Skills Employers Most Value

The top panel of table 2 shows that of the five skills ranked as most important, more than half can be classified as socio-emotional, another 29.7% as higher-order cognitive, and 12.7% as technical. Specifically, socio-emotional skills are named 60 times from a potential 118 responses. Higher-order cognitive skills are listed 35 times, and technical skills 15 times. Basic cognitive skills are only named eight times among the top five preferred skills in our 24-study sample.

Limiting the responses to only the skill identified as the most important, 79% name socio-emotional skills (table 2, top panel, ranking “1”). Nineteen studies rank

Table 2. Employer Ranking of Most Important Skills and Greatest Skills Gaps, Percentage

Ranking	Socio-emotional	Higher-order cognitive	Basic cognitive	Technical	Sample size
Most important skill					
1	79.2	16.7	0.0	4.2	24
2	41.7	37.5	12.5	8.3	24
3	45.8	29.2	8.3	16.7	24
4	45.8	33.3	4.2	16.7	24
5	40.9	31.8	9.1	18.2	22
Total	50.8	29.7	6.8	12.7	118
Greatest skill gap					
1	20.0	46.7	0.0	33.3	15
2	53.3	26.7	0.0	20.0	15
3	53.3	33.3	6.7	6.7	15
4	60.0	26.7	0.0	13.3	15
5	21.4	57.1	7.1	14.3	14
Total	41.9	37.8	2.7	17.6	74

Source: Authors' elaboration based on sample data.

a socio-emotional skill as their first priority, with particular emphasis on teamwork, honesty, and punctuality, but also listing work ethic, interpersonal skills, work attitude, integrity, life skills (negotiation, cultural diversity), and responsibility (table 3). Another four studies rank higher-order cognitive skills as the most important skill set, including communications, problem-solving, and critical thinking skills. One study identifies technical skills as the most important skill set, though the specified “job-related skills” may encompass a larger set of skills. No study names basic cognitive skills as the most important skill set.

Considering the skill identified as the second most-important, socio-emotional skills again emerge the most frequently (table 2, top panel). More than 40% of the sample names a socio-emotional skill, listing many of the same skills that are ranked first. Another 37.5% lists a higher-order cognitive skill, adding time management to the list of priority skills. Basic cognitive skills are named by 12.5% of the sample, with an emphasis on literacy, while 8% identify a technical skill as the second priority. Again, the technical skills named—practical technical skills and professional knowledge—can also encompass other broad skills sets.

These results are consistent with two studies that survey employer preferences in several countries; namely that socio-emotional skills are most important. [Mourshed, Farrell, and Barton \(2012\)](#) interview employers in nine countries and ask them to rate, on a scale from one to ten (low to high) the importance of 13 pre-determined skills; 80% rank work ethic or teamwork—both socio-emotional skills—as the top skills. The higher-order cognitive skill of language and oral communication is ranked third (72% of employers), and hands-on training in discipline (technical) is ranked fourth, with approximately 70% of employers citing it as very important. [Andreasson \(2009\)](#) finds similar results among business executives in 40 countries who identify that the skills most in demand in the next decade are “life skills”, defined as negotiating, networking, working with cultural diversity (48% of the sample), followed by problem solving and leadership.

The equation (1) results for the 24-study sample may mask heterogeneity among the skills needs of employers in different contexts. Thus, we cut the data along different dimensions to explore if the aggregate results are reflected in sub-sets of the sample.

Skills Preferences by Region

Developed countries, with their more sophisticated jobs, may have a greater need for higher-order cognitive and socio-emotional skills compared to less-complex developing country economies. However, different regions of the world show similar patterns in the broad skill sets that employers most value. Socio-emotional skills most frequently emerge among the five most important skills in each region. The only exception is the Middle East, where higher-order cognitive skills dominate in

Table 3. Employer Skills Set Preferences

Region/ country	Priority ranking					Source
	1	2	3	4	5	
World	work ethic	teamwork	local language	communication	hands-on experience	Mourshed et al. 2012
World	life skills	problem solving	leadership	critical thinking	teamwork	Andreasson 2009
LAC	interpersonal	social values	technical	learning processes	n/r	Beneitone et al. 2007
LAC	critical thinking	problem solving	life skills	Leadership	communication	Ogier 2009
Botswana	hard work	honesty	punctuality	Adaptable	communication	World Bank 2014
India	integrity	reliability	teamwork	willingness to learn	entrepreneurship	Blom and Saeki 2011
Indonesia	thinking skills	basic skills	behavioral skills	Computer	n/r	diGropello 2011
Kazakhstan	independent work	time management	communication	Literacy	analytical skills	Sondergaard 2012
Lebanon	teamwork	communication	time management	problem solving	Independent work	World Bank 2012
Macedonia	responsibility	literacy	communications	customer care	motivation	Rutkowski 2010
Mexico	teamwork	communication	problem solving	Innovation	conflict resolution	CIDAC 2014
Pakistan	punctuality	honesty	commitment	Reliability	behavior	Hamid et al. 2011
Peru	teamwork	interpersonal	capable	Proactive	work under pressure	World Bank 2011

Poland	responsibility	motivation	teamwork	advanced technical skill	self-management	Arnhold et al. 2011
Romania	efficiency	professional knowledge	problem solving	Cooperation	Planning	Balcar 2012
St Kitts Solomon Islands	honesty work attitude	work ethic communication	problem solving experience	communications education level	Teamwork decision making	Blom and Hobbs 2008 Close 2012
Tonga	honesty	punctuality	teamwork/ communication	customer skills	hard work	TCCI 2010
Vietnam	job-related skills	practical technical	punctuality	drive/teamwork	theoretical knowledge	World Bank 2008
UK	communication	literacy	numeracy	enthusiasm	teamwork	Martin 2008
US	interpersonal	ethics/integrity	leadership	perseverance	knowledge	Shivpuri and Kim 2014
US	problem solving	fluid intelligence	teamwork	Innovation	communication	Burrus et al. 2013
US	work ethic	Communication	teamwork	critical thinking	communication	Casner-Lotto and Barrington 2006
US	attitude	communication	industry-specific	years of schooling	test scores	Zemsky 1997

Source: Data drawn from each paper cited in last column; “n/r” indicates that a ranking was not requested.

the single-country study from that region (World Bank 2012). Higher-order cognitive skills appear second-most frequently among the top five skills in Latin America and the Caribbean (LAC), Eastern Europe and developed countries, while technical skills are the second-most cited in the East Asia sample. Basic cognitive skills are rarely mentioned among the top five skills in any region.

Socio-emotional skills are the top-rated skill set in most studies in LAC, South East Asia, Middle East/North Africa, Africa, Eastern Europe, and developed countries (US and UK), and the specific type of skill is similar across studies. Five of the six Latin American surveys conclude that employers most value socio-emotional skills, specifically, inter-personal skills, teamwork, attitude, responsibility, honesty, and integrity (Beneitone et al. 2007, Bassi et al. 2012, World Bank 2011, Blom and Hobbs 2008).²⁵ The two South East Asia studies give top ranking to socio-emotional skills, that is, punctuality, honesty, integrity, and reliability (Hamid et al. 2011, Blom and Saeki 2011). The sole Middle East/North Africa study reports that 70% of Lebanese employers most highly rate teamwork (World Bank 2012) while work ethic is the top rated skill by 70% of Botswanan employers, reported in the only African study (World Bank 2014). Three of the four Eastern European studies rank a socio-emotional skills as the priority skill, singling out responsibility and efficiency as the most desired skills in Romania, Macedonia, and Poland (Balcar 2012, Rutkowski 2010, Arnhold et al. 2011); a higher-order cognitive skill (independent work) is ranked first by nearly all employers in Kazakhstan (Sondergaard et al. 2012). Three of the five developed country studies (Shivpuri and Kim 2004; Casner-Lotto and Barrington 2006; Zemsky 1997) find that socio-emotional skills—work ethic, attitude and interpersonal skills—are the preferred skills; the other two countries name higher-order cognitive skills (Burrus et al. 2013, Martin 2008).

The pattern is less uniform in East Asia and the Pacific. Two studies rank socio-emotional skills first, specifying work attitude, and honesty and punctuality (Close 2012; Tonga Chamber of Commerce 2010); this is similar to the skills named in the other regions. However, “job-related skills,” which we classify as technical, were prioritized in the Vietnam study (World Bank 2008), while cognitive skills (higher-order for managers, basic for workers) were ranked first in Indonesia (di Gropello 2011).

Skills preferences are less uniform across regions when assessing the second-most important skill. While socio-emotional skills still dominate among LAC and South Asian employers, other skill sets emerge in the other regions. For example, of the four East Asia Pacific studies, each identifies a different skill set as second priority: basic cognitive in Indonesia (di Gropello 2011), technical in Vietnam (World Bank 2008), higher-order cognitive in the Solomon Islands (Close 2012), and socio-emotional in Tonga (Tonga Chamber of Commerce 2010). Similarly, in Eastern Europe technical skill emerges as a second priority in Romania (Balcar 2012) and basic cognitive

(literacy) is identified in Macedonia (Rutkowski 2010), while socio-emotional skills (motivation and time management) are ranked second in Poland (Arnhold et al. 2011) and Kazakhstan (Sondergaard 2012).

In conclusion, in spite of the small number of studies per region, the evidence to date suggests that all four skills sets are important to employers regardless of region, with more weight placed on socio-emotional and higher-order cognitive skills.

Most Important Skill by Industry: Manufacturing v. Services

Given the different nature of job tasks in the manufacturing and service industries, we might expect to find a greater demand for technical skills in the former, and for socio-emotional skills in the latter. Three of our studies separately report the skills preference rankings for employers in the manufacturing sector and those in the service sector (World Bank 2008; diGropello 2011; diGropello 2008), allowing us to explore this assumption. Starting with the top five ranked skills, socio-emotional and higher-order cognitive skills are named most frequently in both the manufacturing and service sectors. Socio-emotional skills were listed six times each (of a potential 18 mentions for each country-industry matrix) for the manufacturing and service sectors, with particular emphasis placed on independent work, teamwork, and creativity in both sectors. Higher-order cognitive skills—problem-solving and communications—were listed six times for the manufacturing sector, and five times in the service sector. Technical skills were named three times each by both sectors: computer skills, practical experience, and theoretical knowledge of the job.

Turning to a comparison of the skill that is ranked r for each industry, the preferred skill set in manufacturing is also the preferred skill set in services in each of the three countries in the sample. For example, Filipino manufacturing employers rank first the socio-emotional skill of independent work (15%). Service sector employers also rank independent work as the most important skill. The pattern is repeated for the second, third and fourth rankings in the countries in the sample.

Although the industry-specific ranking of the most important skills within country are identical, the weight on each priority ranking reveals expected patterns: socio-emotional skills are more important in the service sector than the manufacturing sector. For example, 54% of Indonesian manufacturing sector employers rate behavioral skills as very important (for their professional staff), as compared to 72% of service firm employers (diGropello 2011). Higher-order communications skills are slightly more important in the service sector than the manufacturing sector, as observed in the Philippines (11.5% versus 10%) (diGropello 2010) and Vietnam (10% versus 8%) (World Bank 2008).

There is not a global pattern in the most important skill in each industry across the three studies that provide industry-level disaggregation. For example, employers in the manufacturing sector prioritize socio-emotional skills in Latin America

(Bassi et al. 2012), “practical” technical skills in Vietnam (World Bank 2008), and cognitive skills in Indonesia (diGropello 2011). Similar patterns emerge for service sector employers. We can conclude, with the caveats associated with a small sample, that within-country skills profiles dominate industry skills profiles.

Most Important Skills by Occupation: Managers v. Workers

Given the leadership and team management role of managers, we might expect employers to demand more higher-order cognitive and socio-emotional skills from their managers and more information-based skills (technical and basic cognitive) from their workers. Six studies report employer rankings of the most important skills for managers as compared to workers (Bassi et al. 2012; CIDAC 2014; diGropello 2011; World Bank 2014; Vasiliev et al. 2013; World Bank 2012). Socio-emotional skills strongly emerge among the top five skills that employers seek in both managers and workers, with higher-order cognitive skills also appearing frequently. Socio-emotional skills were listed ten times (of a potential 30 responses) for managers and 15 times for workers. Teamwork, honesty, hard work, punctuality, and leadership were named for both managers and workers, with slightly more emphasis placed on flexibility, independent work, and self-management for workers. Higher-order skills were listed ten times for managers and six times for workers. Employers prioritize analytical skills, problem-solving, decision-making, and communication among managers, with more emphasis placed on communication for workers. Technical and basic cognitive skills were named once each for managers and for workers.

Employers across countries demand similar skills by occupation, though the range of preferred skills of workers is much broader than that of managers. In all six countries in the sample, employers sought managers with strong socio-emotional and higher-order cognitive skills, particularly problem-solving, teamwork, and leadership. These skills were also demanded of workers across countries, with teamwork added to the list in Russia, Lebanon, and Mexico (Vasiliev et al. 2013; World Bank 2012; CIDAC 2014). However, a range of additional skills were sought in workers, such as basic cognitive skills (diGropello 2011), technical skills (Vasiliev et al. 2013), communications (World Bank 2012; CIDAC 2014), punctuality (World Bank 2014; World Bank 2012), and hard work (World Bank 2014). This small sample comparison suggests that there is a global set of skills for managers, while worker skill sets are somewhat country specific.

Most Important Skill for the Less v. More Educated Workforce

Since more educated workers are likely to hold more complex jobs, employers may require more higher-order cognitive skills and technical skills for these employees than for those who are less educated. Four country studies report employer demand

for skills for more educated compared to less educated employees (Burrus et al. 2013; Casner-Lotto and Barrington 2006; World Bank 2011, 2008), and find that employers overwhelmingly prioritize socio-emotional skills across education levels, while valuing higher-order cognitive skills in their more educated workers. Socio-emotional skills were listed 13 times (of a potential 20 responses) as one of the top five skills of less educated workers as compared to three mentions of a technical skill and one each of higher-order and basic cognitive skills. Similarly, socio-emotional skills were listed 10 times for more educated workers, and higher-order skills were listed five times. Technical skills were named twice as one of the top skills among more educated workers.

Within country comparisons reveal that employers give a similar priority ranking to the broad skill sets sought in more and less educated workers, though the specific skill differs by education level in the four countries in the sample. For example, of the seven skills presented in the Peruvian survey, employers most demanded socio-emotional skills for more and less educated workers, naming interpersonal skills for workers with more than a tertiary education (17%) and teamwork for workers with less than a completed secondary education (23%; World Bank 2011).

Cross-country comparisons show that regardless of education level, workers are expected to excel in socio-emotional skills. Employers of less educated workers in the four country sample all prioritize socio-emotional skills, naming work ethic, dependability, teamwork, and punctuality. The same skills are listed by employers of more educated workers in all four countries. The only exceptions are that higher-order cognitive (communication) emerges for more educated workers in one country (the United States, as reported in Casner-Lotto and Barrington 2006), and Vietnam emphasizes technical skills for both its more and less educated workers, while it is barely mentioned by employers in other countries.

Partial Correlations

The Indonesia study presents a particularly rich disaggregation of employer skills demands, allowing us to understand priority skills in finer segments of the labor market.²⁶ The data show that the most important skills that employers seek in managers are similar whether the manager is in the service or in the manufacturing sector. The only trend that is dampened when aggregating the data by occupation (such that industry is no longer broken out) is that the share of employers that identify socio-emotional skills as most important in their managers (64%) is overstated for manufacturing managers (54%) and understated for service managers (72%); however, this skill is ranked as second-most important for managers regardless of sector. The most important skill for workers are, again, quite similar across industries with one exception: socio-emotional skills are ranked second by service sector employers (38%) and third by manufacturing sector employers (25%; diGropello 2011).

Greatest Skill Gaps

As noted above, it is possible that when employers cite the most important skill for the production process, they may actually be citing the greatest skill gap. A review of the skills gap literature shows that employers are not confusing these concepts, with different trends emerging in the gap analysis than those observed in the previous exercise.

The bottom panel of table 2 presents the greatest skills gaps, as calculated in equation (1), and shows that higher-order cognitive skills emerge more strongly in the gap analysis than in the priority ranking of the most important skills.²⁷ More than 40% of the 15-study sample identifies a socio-emotional skill as one of the top five skill gaps, naming a lack of behavioral and inter-personal skills, whereas “work ethic,” which emerged strongly as one of the most important skills valued by employers, as discussed above, does not emerge as a priority skill gap (table 4). Nearly an equal share of studies, 38%, name a higher-order cognitive skill as one of the top five skill gaps. The specific skills listed are similar to those identified above by employers as the most important skills.

Turning to the top-ranked skill gap, higher-order cognitive skills are named by nearly half of the employers, and technical skills, including professional skills, job-specific skills and work experience, are named by 33% of the sampled employers. While we classified all of these as “technical”, several likely include all four of our broad skills sets. For example, “professional skills” or “work experience” may include knowledge of specific equipment (technical), working with others (socio-emotional), the ability to resolve problems (higher-order cognitive), and basic math for operating the equipment (basic cognitive).

The second-most important skills gap is dominated by socio-emotional skills, named by 53.3% of the sample (table 2, bottom panel). Behavioral rather than values-related skills (such as honesty, work ethic) emerge. Another 26% name higher-order cognitive skills as the second-most important skill gap, while one-fifth of the sample lists a technical skill. Basic cognitive skills are barely mentioned as an important skill gap; this may suggest that workers’ dominance of basic numeracy and literacy are adequate for employers in our sample, or that other skills gaps are more noticeable to employers.

Most Pressing Skills Gaps by Region

As discussed above, though the skills that employers most value did not differ by region, the different education and industry structures may lead to different skills gap profiles in more and less sophisticated economies. The expected trends emerge to some extent where technical skills gaps are most observed by Eastern European employers, while developed country employers note the absence of higher-order

Table 4. Employer Skills Gaps

Country	1	2	3	4	5	Source
Global	problem solving	communication	work experience	teamwork	English	Mourshed et al. 2012
Latin America	critical thinking	communication	life skills	STEM	leadership	Ogier 2009
Indonesia	English	computer	thinking skills	behavioral	n/r	diGropello 2011
Lebanon	independent work	computer	Numeracy	foreign language	communication	World Bank 2012
Macedonia	responsibility	motivation	Communication	customer orientation	literacy	Rutkowski 2010
Mexico	technical knowledge	leadership	Innovation	teamwork	communication	CIDAC 2014
Poland	advanced technical skill	responsibility	motivation/commitment	self-management	problem solving	Arnhold et al. 2011
Romania	professional skills	efficiency	problem solving	customer orientation	planning	Balcar 2012
Russia	professional skills	problem solving	conscientiousness	decision-making	teamwork	Vasiliev et al. 2013
Solomon Islands	analytical skills	work attitude	decision making	communication	technical skills	Close 2012
Tonga	honesty	punctuality	customer awareness	commitment	problem solving	TCCI 2010
United Kingdom	foreign language	customer awareness	diversity	self-management	problem solving	CBI 2012
United Kingdom	planning	customer awareness	teamwork	problem solving	communication	UKCES 2012
United Kingdom	job-specific skills	business awareness	enterprising	vocation-specific skills	customer care	Martin 2008
United States	language	communication	leadership	work ethic	technical skills	Casner-Lotto and Barrington 2006

Source: Data drawn from each paper cited in last column.

cognitive skills. In three (Romania, Russia, and Poland) of the four (Kazakhstan) studies of Eastern European employers (Balcar 2012; Vasiliev et al. 2013; Arnhold et al. 2011), the lack of technical skills was most lamented, followed by socio-emotional skills (efficiency, motivation, and responsibility). In contrast, employers in the US and UK largely identify a lack of higher-order cognitive skills (language, planning), though one of the three UK studies identifies job-specific skills as the primary skill gap. Socio-emotional skills begin to emerge as the second-greatest skills gap in both Eastern Europe and developed country priority rankings. The results are too mixed in East Asia, and the sample is too small in Latin America, Africa, and the Middle East to report regional patterns.

Most Important Skills Gaps: Managers v. Workers

Employers in the five studies that disaggregate employer-perceived skills gaps by occupation (UKCES 2012; diGropello 2011; Vasiliev et al. 2013; World Bank 2012; CIDAC 2014) list a higher-order cognitive skill, or socio-emotional skills nine times each (of 25 potential responses) as one of the top five skills gaps faced by their non-manager workers; employers name technical skills gaps four times. The employers emphasize socio-emotional skills as most lacking in their managers, naming them 10 times, compared to seven mentions of higher-order cognitive skills and technical skills gaps, which were mentioned five times.

Although employers value similar skills in managers and workers, the top skills gaps differ by occupation. Similar to the aggregate measurement of the greatest skills gaps, the top-ranked skill gap among managers in three countries are primarily higher-order cognitive skills—decision-making, strategic management, and foreign language. Technical and socio-emotional skills are the most highly ranked skills gap in managers by one country each (Lebanon and Mexico, respectively). In contrast, a range of broad skills sets emerged as most lacking among workers. Employers in two countries named technical skills as most missing in their workers (UK and Mexico) while two others listed socio-emotional skills (conscientiousness and independent work). The fifth country named a higher-order cognitive skill (English language). The second-most important skills gaps for non-managerial workers reveal the same pattern: employers in two countries listing technical skills, and one country each listing higher-order cognitive, basic cognitive, and socio-emotional skills.

The Skills Development Process and Policy for Developing the Skills Employers Demand

Employer voices tell us that a broad range of skills are necessary for labor success. Some skills are taught after completing general education, particularly technical

training, while others are commonly acquired at a younger age, namely basic cognitive skills. A relatively large body of literature discusses appropriate methodologies for teaching these skills. However, there is much less guidance on the appropriate ages to learn socio-emotional and higher-order cognitive skills and the appropriate methodologies to teach them. The developmental psychology and education literature provides a framework to guide these skill development processes.

Just as with basic cognitive and technical skills, socio-emotional and higher-order cognitive skills are best taught at specific stages in the life-cycle. Neurological, biological, psychological, and social processes dictate that certain skills cannot be learned before certain ages (Guerra et al. 2014). For example, a toddler is me-centered and is not able to feel the genuine empathy that a primary school student displays. It is not for a lack of being taught to be empathetic, but instead the toddler is not neurologically or psychologically “ready”, and a toddlers’ social context—where she is still largely guided by caregivers—is not conducive to practicing, and thereby developing, this skill. Further, certain skills are the foundation for other skills (Cunha et al. 2005). For example, basic math—which is developmentally appropriate for primary school—is a foundation for secondary-school introduction to physics, just as impulse control is a foundation for the higher-order cognitive skill of problem solving. Heckman (2008) argues that most of the skills gaps at age 18 that help to explain adult outcomes are already present at age five, and that disadvantaged children are at a particular risk of falling behind early and not being able to catch up.

Table 5 presents a rough representation of the appropriate period of the life-cycle during which one may acquire the skills that the employer surveys suggests. In the early years (age 0–5), the most basic cognitive skills can be acquired. Also, some of the most important foundational socio-emotional skills are developed during this period, such as delayed gratification, impulse control, and working with others. During middle childhood (age 6–11), learning really takes off with the ability to rapidly acquire basic cognitive skills—with some higher-order cognitive emerging, such as problem solving—and the child is in a context to develop more complex socio-emotional skills related to engaging and negotiating with others. During adolescence (12–17), the foundations should already be built, the brain is neurologically and psychologically ready, and the social context is appropriate to fully engage in higher-order cognitive development and complex socio-emotional development while still acquiring basic cognitive skills and beginning to develop technical interests and skills. Once reaching early adulthood (18–26), technical skills can be built on the foundation of the basic cognitive skills, higher-order cognitive skills, and socio-emotional skills learned earlier in life.

A lot of skill development occurs outside the classroom, indicating that a wide range of age-relevant actors are best positioned to develop the young person’s skill sets (table 5). Drawing from the Bronfenbrenner ecological risk framework (1979), we see that a young person’s actors of influence broaden, and move away from the

Table 5. Skill Formation at Different Points of the Life-cycle

Period	Skill type	Age-relevant Actors	Sample programs to Guide Actors to Build the Skills (for a list of evidence-based programs, see Guerra et al. 2014)
Early years (0–5)	<ul style="list-style-type: none"> • Basic cognitive • Foundational Socio-emotional 	Family, ECD programs	Quality parenting (Nuevo Postnatal, Program on Cognitive Development, Early Enrichment Program) Child-focused ECD (Perry Program, Head Start)
Childhood (5–12)	<ul style="list-style-type: none"> • Basic cognitive • Socio-emotional • Foundational higher-order cognitive 	Family, schools, peers	Holistic curriculum, teaching methodology, and monitoring and evaluation system (KIPP, EPSIS, Enseña Chile, RCCP)
Adolescence (13–17)	<ul style="list-style-type: none"> • Basic cognitive • Socio-emotional • Higher-order cognitive • Initial technical 	Schools, peers, mentors, family	After-school/extra-school/out-of-school programs/activities (BBBS, Student Success Teams)
Early (17–29) and Middle (30+) Adulthood	<ul style="list-style-type: none"> • Socio-emotional • Higher-order cognitive • Technical 	Higher education institutions, training institutes, work place, family	Apprenticeships (Jóvenes programs) Experiential on-the-job training Skills certification system, support systems for worker transition to firms where new learning can occur

Source: Own elaboration based on [Banerji et al. \(2010\)](#) and [Guerra, Modecki, and Cunningham \(2014\)](#).

nuclear family, as she ages. In early childhood, family and early childhood development programs are the age-relevant actors due to the biological forces of children being psychologically attached to a core, known family, and to practical issues related to a child's independence. Thus, these are the actors responsible for developing age-associated skills. During middle childhood, the school gains in importance, as do peers and other mentors, but the family still plays a dominant role. During adolescence, the family starts to fade as peers, educational institutions, and non-family mentors grow in importance, and finally, in young adulthood, socio-emotional skills are refined and shaped by higher education institutions ([Robins et al. 2001](#)), work environment, and the family ([Roberts, Caspi, and Moffitt 2003](#)).²⁸ Technical skill development also continues into adulthood through on-the-job training; in fact, once reaching adulthood, firms are the primary source of new skills acquisition for workers ([Villaseñor 2013](#)).

There are a multitude of methods for effectively teaching the appropriate skills by each actor at each life-cycle stage (table 5). For parents of young children, good family leave policies that allow parents to provide quality parenting and programs to enhance parental learning and encouragement of early stimulation and nutrition have been shown to foster greater acquisition of cognitive skills and socio-emotional skills in a child (Gertler et al. 2014; Kagitcibasi 1988). Child-centered ECD that focuses on improving personality traits and managing externalizing behaviors while also acquiring basic cognitive skills have shown positive results in employment, wages, and positive behaviors for more than 30 years after program participation (Schweinhart et al. 2005).

Programs to help develop socio-emotional learning in middle childhood are largely designed for the school setting, and are complemented by parental engagement. CASEL (2013) recommends four prerequisites for developing socio-emotional skills in schools: emotionally supportive teachers, a positive school climate, socio-emotional learning integrated into subject-based lessons, and free-standing lessons to teach socio-emotional skills. These may take place in the classroom via regular curriculum and instruction activities, or through complementary programs. However, the research finds that the most successful socio-emotional learning occurs when incorporated into the day-to-day curriculum and when connected to other school activities (Greenberg et al. 2003). For example, the US Knowledge is Power Program (KIPP) implemented in primary and secondary schools sets expectations, requires behaviors grounded in good socio-economic skills, and works closely with each child and their families to ensure success (Angrist et al. 2010). Similar programs exist in developing countries as well (Heckman and Kautz 2012; Alfonso et al. 2012). Impact evidence shows these methods positively affect socio-emotional skill development, associated positive behaviors, and cognitive learning outcomes, especially in middle-childhood (CASEL 2013; 2015).

Both middle childhood and adolescence are key periods for developing higher-order cognitive skills, and pedagogical methods can be powerful tools for fostering these skills. The most effective methodology for teaching problem-solving, creativity, communications, and overall thinking skills is largely through student-centered, structured pedagogical methods (King et al. 1998) where the educator uses questions, guided practice, team activities, student discussions, and peer tutoring, for example, to engage students to solve problems, test their ideas with other students, and express themselves verbally and in writing (Brookhart 2010). When the same material is taught through traditional didactic methods to a control group and interactive methods to a treatment group, the group receiving the interactive teaching has a statistically significant greater performance on language and math exams than the group receiving the didactic instruction (Brookhart 2010).²⁹

While adolescents benefit from the school-based programs (CASEL 2015), their greater independence from the family sphere and initial transition to world of work implies that mentoring programs and technical training can also contribute to their

socio-emotional and higher-order cognitive skills development process. Mentoring programs can take different forms such as after-school clubs, programs that pair model adults with children, or sports programs run by child development specialists; the former two models have shown to increase cognitive and socio-emotional skills of participants relative to control groups (Tierney and Baldwin 2000; Boys & Girls Clubs of America 2004). As the school-to-work transition process begins, job training and apprenticeship programs should be augmented by socio-emotional and higher-order cognitive skills development. For example, such a program in the Dominican Republic has been shown to increase leadership, conflict management, self-esteem, interpersonal skills (for some groups), organization skills, empathy, and hard work, in comparison to a randomly selected control group that did not receive the intervention (Veza et al. 2014; Ibarraran et al. 2012).

Skills development in early adulthood is primarily focused on acquiring technical and higher-order cognitive skills; programs for socio-emotional skill development are quite rare. There is an increasing consensus that technical training models need to reform to better teach the range of skills that employers demand (OECD 2014; Fawcett 2014). Specifically, training should be delivered through structured experience-based (rather than classroom) learning that reinforces all four broad skills sets by real-world practice in a supportive context. Although experiential learning is common practice in European technical training systems (Fawcett et al. 2014), employers in other countries can find room for improvement. For example, Latin American executives identify “work-study programs that bring students the work place” as the primary way that firms can contribute to skills development, though few engage in the practice (Ogier 2009). The public sector can provide technical assistance and financial incentives to alleviate the costs of designing and implementing a training program while not affecting firm profitability. For example, Colombian law (Law 789 of 2002) provides tax breaks to firms to train their workers. Linked to this is the emerging recognition that instructors should be recruited from the private sector who can provide hands-on knowledge. Most Latin American executives in a small sample thought that the lack of teaching skill to teach in an applied manner is a bigger problem than educational infrastructure, curriculum, or teacher qualifications in the subject matter (Ogier 2009).

Conclusions

The review confirms that there is a mismatch between the education sector’s perception of skills demand and that of the productive sector. While the education sector believes that it prepares students well for the labor market (Mourshed, Farrell, and Barton 2012; IFC 2011) by focusing on basic cognitive and technical skills development, a review of 24 studies that measure employer skills preferences

and 15 studies that measure key skill gaps find that employers have a different view of the most important skills for labor market success and where the principle skills gaps are.

While employers around the world value all four skills sets, socio-emotional and higher-order cognitive skills are consistently prioritized. More than 50% of the top five skills identified by employers can be classified as socio-emotional skills, and 79% of the top-ranked priority skill are a socio-emotional skill. Another 30% of the top five skills can be classified as higher-order cognitive, with a top ranking in about 17% of the cases. Oral communication—a higher-order cognitive skill—ranks consistently very high, as do a small set of socio-emotional skills, namely ethics, punctuality, honesty, and teamwork.

Technical skills, which are often assumed by policymakers to be equivalent to job skills, were ranked as third-most important in the aggregate estimate, but they emerge strongly for some groups. Specifically, Eastern European employers add technical skills to the list of priority skills sets, joining socio-emotional and higher-order cognitive skills. Employers in all other regions and in the US do not value technical skills as highly. This variable was difficult to analyze, though, since the classification of “technical skills” may have over-simplified employer preferences since all “job-related” responses were put in this skills set, even though many job related skills are socio-emotional or higher-order cognitive by nature. Technical skills seem to be complements to, not substitutes for, cognitive and socio-emotional skills.

Basic cognitive skills were rarely prioritized, which may reflect that these skills are not needed or, more likely, that they are in sufficient supply that employers do not notice how important they are. This interpretation is supported by the lack of mention of basic cognitive skills among managers, who most certainly need these skills to perform their jobs well.

The aggregate patterns hold up when dividing the sample by region, industry (manufacturing v. service firms), occupation (managers v. workers), and education level of the workforce; socio-emotional and higher-order cognitive skills emerge most strongly for each sub-group. And while the priority skills sets for managers and workers or for less and more educated workers are the same across countries, priority skills sets for manufacturing versus service sector differ across the three countries in the sub-sample. These results should be understood with a large margin of error given the very small size of the samples.

Employers identify significant skills gaps. The aggregate analysis shows that socio-emotional skills were most cited among the top five skills gaps, but higher-order cognitive skills were the top-ranked skill gap. About 42% of the top five skills gaps can be classified as socio-emotional skills. However, they dominate the second through fourth priority rankings. Instead, higher-order cognitive skills are identified as the most important types of skills in nearly half of the sample. When

disaggregating by region and occupation, slightly different trends emerge. Among regions, technical skills are named as the priority skill gap in Eastern Europe, but not named as the top skill gap by any study in any other region. Socio-emotional skills are particularly important in developing regions compared to the developed countries in the sample.

Although socio-emotional and higher-order cognitive skills are consistently valued by employers, they often fall outside of school curriculum or teaching methods. When we bring employer preferences together with the skills formation process as understood by developmental psychologists, four key conclusions for education/skills development policy emerge. First, the skills development process necessarily begins at birth (or before) and continues throughout the life cycle. Certain skills that employers demand are formed in the toddler years and other skills can only be developed once the foundational skills are there. Waiting until school is completed to begin developing job-relevant skills is too late. Second, schools can play a much larger role in socio-emotional skill development by developing a teacher's personal skills, strengthening the school climate so it encourages positive behaviors, weaving socio-emotional skills development and practice into pedagogical methods, and teaching these skills as part of the curriculum. Third, other actors should play a larger and more structured role in skills development. Certain skills are better taught by parents, mentors, or colleagues in the work place. This points to an education/skills development strategy and related programs to support the actors that are best suited to provide instruction to children at each age-appropriate stage. Fourth, the skills most demanded by employers—higher-order cognitive skills and socio-emotional skills—are largely taught (the former) or refined during adolescence, which argues for a secondary school general education until these skills are formed. Rather than the early tracking of youth into technical training (ranked third by employers), skills/education systems need to ensure that the foundational basic and higher-order cognitive and socio-emotional skills are there to allow for effective technical skill acquisition.

While this paper presents evidence from the literature, more work needs to be done to definitively guide policy. First, the research needs to move beyond simple correlations and into marginal effects, namely, to generate parametric estimates that will better define the skills sets demanded by employers in different industries and occupations. Second, the question of revealed versus stated preferences merits greater research to determine the validity of employers preference surveys. While this paper presents evidence that these preference sets are very similar, by comparing employer survey skills to those used by for-profit headhunting firms and want ads, a direct analysis is necessary to understand the extent to which this gap may bias employer survey findings. Finally, the absence of consistency in definitions and measurement makes cross-country comparisons difficult. The research needs to move toward a common set of concepts to allow for cross-country learning.

Many thanks to Monica Parra and Mariana Escalante for their contributions to the paper, and to Stephen Close, Margaret Grosh, Katia Herrera, William Maloney, Noel Muller, Jan Rutkowski, Fred Oswald, and Alexandria Valerio for their critical review and suggestions.

Notes

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1. [Hanushek and Woessman \(2008\)](#) identify two sources of measurement error. First, there is substantial heterogeneity in the skills acquired at each level of schooling across countries, regions within countries, and schools within regions. Second, much skill acquisition occurs outside of the classroom ([Hanushek 1979](#)).

2. See [Almlund et al. \(2011\)](#) and [Borghans et al. \(2008\)](#) for reviews of this literature.

3. [Autor, Levy, and Murnane \(2003\)](#) illustrate this phenomenon by arguing that as firm technology improves, repetitive and predictable tasks are automated and workers performing routine tasks are substituted by computers, which themselves need to be complemented by workers who perform non-routine problem solving.

4. We intentionally include a broad geographical mix of countries to permit us to identify if there are global trends in skills demand or if skills demand and shortages differ by region or country.

5. Although the economics literature divides skills into cognitive and non-cognitive skills, psychologists argue that the latter is a misnomer since they clearly involve cognition. With a nod to our psychology colleagues, this paper instead uses the term “socio-emotional skills.” For a light-hearted review of terminology, see http://www.npr.org/sections/ed/2015/05/28/404684712/non-academic-skills-are-key-to-success-but-what-should-we-call-them?utm_campaign=storyshare&utm_source=twitter.com&utm_medium=social.

6. The concept of “higher” and “lower” order (or, what we call “basic”) cognitive skills emerges from Bloom’s taxonomy of learning, where knowledge and comprehension are classified as “lower order” skills; built upon these are the higher-order skills encompassed in critical thinking ([Bloom et al. 1956](#)).

7. This study finds that the impact of school attainment on wages falls from 7.1–5.9% after controlling for literacy scores.

8. The psychology literature defines technical skills as a sub-set of cognitive skills ([Almlund et al. 2011](#)).

9. [Tan and Nam \(2012\)](#) review recent studies estimating the wage premium for technical training to general education and find higher returns to the latter. The results are merely suggestive, though, since the reviewed studies do not control for unobservable skills, which may be both correlated with higher wages, and with the choice of education path, thus potentially biasing the comparison.

10. The idea that socio-emotional skills are an important driver of economic success can be traced to [Bowles and Gintis \(1976\)](#), who explain that a measurable part of the variance in earnings among observationally equal individuals, particularly those with equal levels of education, are due to behavioral skills.

11. The socio-emotional skills that are most commonly measured and correlated in the economics literature are limited to personality trait facets based on the Goldberg Big 5 construct ([Goldberg 1993](#)), listed above. While this construct has been validated across cultures and time, it is limited in that it does not measure behaviors or attitudes.

12. See [Almlund \(2011\)](#) for a review of literature.

13. This search produced papers from literature in economics, human resources psychology, industrial sociology, management, and education.

14. Research Papers in Economics (IDEAS-RePEc) is the largest bibliographic database dedicated to Economics in which most of the papers are fully downloadable; see <http://ideas.repec.org/>. We searched the following JEL codes: J23 (Labor Demand) and J24 (Human Capital; Skills; Occupational Choice; Labor Productivity).

15. EconLit is the American Economic Association's electronic bibliography; see www.aeaweb.org/econlit/.

16. See www.eric.ed.gov; ERIC is one of the primary data base for education literature.

17. The website www.psycontent.com is the database of the American Psychological Association, specialized in psychology and psychiatric journals, and includes the following databases: PsyJOURNALS, PycARTICLES[®], PycINFO[®] and PsyCOLLECTION[®].

18. The earlier literature is summarized in [Cotton \(1993\)](#). We include one paper from 1997 in order to balance out the samples that use US data. The recent papers only ask employers about skills demand for more educated workers; [Zemsky \(1997\)](#) provides information about the median worker.

19. A detailed description of each study sample frame is available from the authors.

20. Anecdotes (from the authors' interviews) may illustrate the point. An owner of a bottling company in Tonga said that when interviewing, he first considers the body language when meeting the candidate, then assesses eye contact, and, once the person passes that phase, he asks about technical skills. A psychologist working with youth in Jamaica tells of a young woman who, after several failed interviews, asked if the profane tattoo on her forehead may have been a factor in her lack of success.

21. Many surveys do not go into detail on technical skills, so "job-relevant skills", computer skills, and "work experience" are included in this set.

22. The socio-emotional skills defined in the employer surveys differ from those in the economics literature. The standard research uses umbrella concepts that encompass a range of attitudes and behaviors while employers indicate very specific attitudes and behaviors. For example, the "teamwork" skill that many employers define is not included in the standard literature, but teamwork concept is encompassed in the extraversion and agreeableness umbrella concepts that have been well studied. [Guerra, Modecki, and Cunningham \(2014\)](#) map the 140 employer skills identified in this paper to the Goldberg Big 5 construct most commonly used in the economics literature.

23. Several studies only allow employers to priority rank the top five skills or skill gaps. Thus, we also limit r to five.

24. The data do not provide sufficient information to disaggregate skills gaps patterns by industry or by education level of the worker.

25. Ability to collaborate and cooperate with others, control emotions, and avoid negative reactions

26. The data in this review do not allow us to estimate partial correlations. However, the Indonesia study provides some insight into the question of partial versus simple correlations since it observes the prioritization of two dimensions simultaneously: industry and occupation.

27. Unlike in the sample which asks about the most important skills, the data on key skill gaps is disaggregated across skill level and type of industry in many of the studies. Since we do not know the share of the labor force in each of these categories, we cannot appropriately weight the responses. Thus, we make a very general assumption that the labor force is equally distributed across these categories and we take a simple average across skill level or industry.

28. Contrary to decades of assumptions of the non-malleability of personality traits, psychologists are finding that personality change continues into adulthood once careers have been established that shape personality more profoundly than transitory early adulthood jobs ([Roberts 1997](#)), and as life changes such as marriage affect personality ([Robins, Caspi, and Moffitt 2002](#)).

29. Given the difficulty of directly measuring higher-order cognitive skills (see [King et al. 1998](#) for a discussion), they are indirectly measured through performance on content tests that require the use of higher-order cognitive skills to score higher.

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*Indicates the reference is a data point for this paper.

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