SABER | System Assessment and Benchmarking for Education Results

SABER-Teachers Background Paper No. 5

What Are the Different Profiles of Successful Teacher Policy Systems?

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August 5, 2011

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I. Introduction

There is increasing interest in policies that can improve teacher effectiveness. Over the past decade, both developed and developing countries have become growingly concerned with how to raise the effectiveness of their teachers. This interest seems to have been sparked by a series of factors:[1]

- Student achievement has been found to correlate with economic and social progress. A few influential studies have found that countries with higher student achievement in international exams have higher rates of economic growth and that those individuals who perform better earn higher wages.[2] Others have found that countries with better educated students have more consolidated democracies.[3] This has convinced many of the potential importance of paying attention to students' learning outcomes.

- International assessments have identified countries that need to raise student learning. A considerable number of countries at various income levels have begun to participate in international student achievement tests. This has allowed them to compare the achievement of their students with that of their peers in other countries, and in many cases, to realize that their students were under-performing by world standards.

- Recent studies have shown teacher effectiveness is a key predictor of student learning. A number of studies that teacher effectiveness is the most important school-based predictor of student learning and that several consecutive years of outstanding

[1] This section draws on Bruns & Santibañez (2011). "Making Teachers Accountable." In B. Bruns, D. Filmer & H. A. Patrinos (Eds.) Making Schools Work: New Evidence on Accountability Reforms. Washington, DC: The World Bank.

[2] See, for example: Hanushek & Woessmann (2007). "Education Quality and Economic Growth." Washington, DC: The World Bank. Hanushek & Woessmann (2009). "Schooling, Cognitive Skills, and the Latin American Growth Puzzle." NBER Working Paper 15066. Cambridge, MA: National Bureau of Economic Research (NBER). Pritchett, L. & Viarengo, M. (2009). "Producing Superstars for the Economic Mundial: The Mexican Predicament with Quality of Education. PEPG Working Paper 09-01. Cambridge, MA: Program on Education Policy and Governance (PEPG).

[3] See Barro, R. J. (1999). "Determinants of Democracy." The Journal of Political Economy. 107(S6): S158-S183. Campante, F. & Glaeser, E. L. (2009). "Yet Another Tale of Two Cities: Buenos Aires and Chicago." NBER Working Paper 15104. Cambridge, MA: National Bureau of Economic Research (NBER). Glaeser, E. L., Ponzetto, G. A. M. & Shleifer, A. (2007). "Why Does Democracy Need Education?" Journal of Economic Growth. 12: 77-99.

teaching can offset the learning deficits of disadvantaged students.[4] This has made many realize of the potential of teacher policies to improve student learning.

Yet, evidence on the policies that raise teaching quality is incomplete and mixed. Despite the growing demand for guidance on policies that raise teacher effectiveness, evidence from impact evaluation studies in this area is still uneven:[5]

- There is insufficient evidence on the impacts of many teacher policies. For example, while many studies have sought to identify the ideal requirements to enter the teaching profession, research has found that the observable characteristics of teaching candidates (e.g., classroom experience, educational attainment or certification status) account for a very small share of variations in their effectiveness on the job.[6] This is concerning because the more demanding a set of requirements is, the smaller and less diverse a teacher talent pool will be[7] and teachers' race and gender seems to matter for student learning.[8]

- The impact of many reforms depends on specific features of their design. For example, while many rigorous evaluations of merit pay programs in low- and middle-income

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[4] Hanushek, E. A., & S. G. Rivkin. (2010). "Generalizations about Using Value-Added Measures of Teacher Quality." American Economic Review. 100 (2): 267–71. Hanushek, E. A., J. F. Kain, D. M. O'Brien, and S. G. Rivkin. 2005. "The Market for Teacher Quality." NBER Working Paper 11154. Cambridge, MA: National Bureau of Economic Research Working Paper (NBER). Rockoff, J. E. (2004). "The Impact of Individual Teachers on Student Achievement: Evidence from Panel Data." American Economic Review, 94(2), 247-252. Sanders, W. L., & Rivers, J. C. (1996). "Cumulative and Residual Effects of Teachers on Future Student Academic Achievement." Research Progress Report. Knoxville, TN: University of Tennessee Value-Added Research and Assessment Center.

[5] This section draws on Bruns & Santibañez (2011). "Making Teachers Accountable." In B. Bruns, D. Filmer & H. A. Patrinos (Eds.) Making Schools Work: New Evidence on Accountability Reforms. Washington, DC: The World Bank. Umansky, I. (2005). "A Literature Review of Teacher Quality and Incentives." In Vegas, E. (Ed.) Incentives to Improve Teaching. Lessons from Latin America. Washington, DC: The World Bank.

[6] Goldhaber, D. (2002). "The Mystery of Good Teaching: Surveying the Evidence on Student Achievement and Teachers' Characteristics." Education Next, 2(1), 50-55. Kane, T. J., Rockoff, J. E., & Staiger, D. O. (2006). "What Does Certification Tell Us About Teacher Effectiveness? Evidence from New York City." NBER Working Paper 12155. Cambridge, MA: National Bureau of Economic Research (NBER). Rivkin, S. G., Hanushek, E. A., & Kain, J. F. (2005). "Teachers, Schools and Student Achievement." Econometrica, 73(2), 417-458.

[7] Hanushek, E. A., & Pace, R. R. (1994). "Understanding Entry into the Teaching Profession." In R. G. Enhrenberg (Ed.), Choices and Consequences: Contemporary Policy Issues in Education. Ithaca, NY: ILR Press. Hanushek, E. A., & Pace, R. R. (1995). "Who Chooses to Teach (and Why)?". Economics of Education Review, 14(2), 101-117.

[8] Dee, T. S. (2001). "Teachers, Race and Student Achievement in a Randomized Experiment." NBER Working Paper 8432. Cambridge, MA: National Bureau of Economic Research (NBER). Dee, T. S. (2005). "Teachers and the Gender Gaps in Student Achievement." NBER Working Paper 11660. Cambridge, MA: National Bureau of Economic Research (NBER).

countries have found that they can produce positive and statistically significant gains in student achievement,[9] others have cautioned that the method used to evaluate teacher performance, the level at which incentives are awarded (i.e., individual or group), the size of the incentives and how well they are tied to the behaviors they seek to elicit influence the impact of these merit pay programs.[10]

- The same policies can have very different impacts in different contexts. For example, while alternative pathways into teaching such as Teach for America have been found to have limited impact on student achievement in the United States,[11] the question of whether they may, given a certain scale and time period, lead to improvements in student learning remains to be answered. In addition, a recent study of a similar

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[9] Duflo, E., R. Hanna, and S. Ryan. (2010). “Incentives Work: Getting Teachers to Come to School.” Unpublished manuscript, Abdul Latif Jameel Poverty Action Lab (JPAL), Massachusetts Institute of Technology, Cambridge, MA. Glewwe, P., N. Ilias, and M. Kremer. 2010. “Teacher Incentives.” American Economic Journal: Applied Economics 2 (3): 205–27. Lavy, V. (2002). “Evaluating the Effect of Teachers’ Group Performance Incentives on Pupil Achievement.” The Journal of Political Economy 110 (6): 1286–317. Lavy, V. (2009). “Performance Pay and Teachers’ Effort, Productivity, and Grading Ethics.” The American Economic Review 99 (5): 1979–2011. Muralidharan, K., and V. Sundararaman. (2009). “Teacher Performance Pay: Experimental Evidence from India.” National Bureau of Economic Research Working Paper 15323, NBER, Cambridge, MA. Rau, T., and D. Contreras. (2009). “Tournaments, Gift Exchanges, and the Effect of Monetary Incentives for Teachers: The Case of Chile.” Department of Economics Working Paper 305, University of Chile, Santiago.

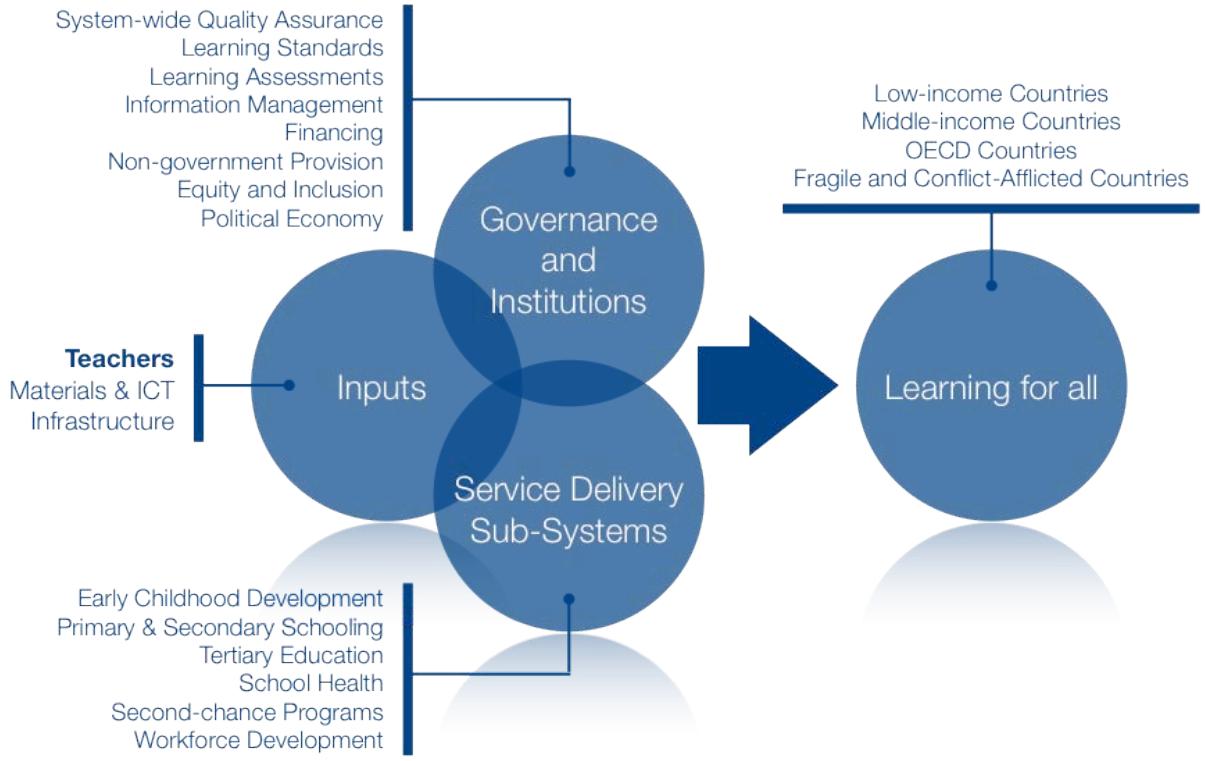
[10] Ahn, T., & Vigdor, J. (2010). "The Impact of Incentives on Effort: Teacher Bonuses in North Carolina." PEPG Working Papers Series. Cambridge, MA: Program on Education Policy and Governance (PEPG). Bacolod, M. P., DiNardo, J., & Jacobson, M. (2009). "Beyond Incentives: Do Schools Use Accountability Rewards Productively?", NBER Working Paper 14775. Cambridge, MA: National Bureau of Economic Research (NBER). Ballou, D. (2001). "Pay for Performance in Public and Private Schools." Economics of Education Review, 20(1), 51-61. Eberts, R. W. (2002). "Teacher Performance Incentives and Student Outcomes." Journal of Teacher Education, 37(4), 913-927. Murnane, R. J., & Cohen, D. K. (1986). "Merit Pay and the Evaluation Problem: Why Most Merit Pay Plans Fail and Few Survive." Harvard Educational Review, 56(1), 379-388. Podgursky, M., & Springer, M. G. (2008). "Teacher Performance Pay: A Review." Journal of Policy Analysis and Management, 24(4), 909-949.

[11] Boyd, D., Grossman, P., Lankford, H., Loeb, S., & Wyckoff, J. (2006). "How Changes in Entry Requirements Alter the Teacher Workforce and Affect Student Achievement." Education Finance and Policy, 1(2), 176-216. Boyd, D., Hammerness, K., Lankford, H., Loeb, S., Ronfeldt, M., & Wyckoff, J. (2009). "Recruiting Effective Math Teachers, How Do Math Immersion Teachers Compare?: Evidence from New York City." New York, NY: National Center for the Analysis of Longitudinal Data in Education Research (CALDER). Darling-Hammond, L., Holtzman, D., Gatlin, S. J., & Vazquez Hellig, J. (2005). "Does Teacher Preparation Matter? Evidence About Teacher Certification, Teach for America and Teacher Effectiveness." Education Policy Analysis Archives, 13(42). Decker, P. T., Mayer, D. P., & Glazerman, S. (2004). The Effects of Teach For America on Students: Findings from a National Evaluation. Princeton, NJ: Mathematica Policy Research, Inc. Xu, Z., Hannaway, J., & Taylor, C. (2007). "Making a Difference? The Effects of Teach for America in High School." National Center for Analysis of Longitudinal Data in Education Research (CALDER), Urban Institute.

initiative in Latin America suggests that alternative pathways into teaching could have a considerable impact in raising student learning in some countries.[12]

The Human Development Network's Education Sector at the World Bank has launched an initiative called SABER to fill the gap in data on education policies. This effort, called System Assessment and Benchmarking for Education Results (SABER), seeks to collect, analyze and disseminate data on education policies in developed and developing countries. SABER includes the main education policy domains at all levels of education services, from finance to learning assessments, learning standards to early childhood development (**Figure I.1**). SABER-Teachers focuses on developing tools to collect, analyze, and disseminate information on teacher policies around the world.

Figure I.1: SABER Overview



Source: Authors' elaboration.

SABER-Teachers collects data on ten comprehensive teacher policy areas. These areas include: (i) requirements to enter and remain in teaching; (ii) initial teacher preparation; (iii) recruitment and employment; (iv) teacher workloads and autonomy; (v) professional development; (vi) compensation: salary and non-salary benefits; (vii) retirement

[12] Alfonso, M., Santiago, A., & Bassi, M. (2010). "An Alternative Pathway into Teaching: Placing Top University Graduates in Vulnerable Schools in Chile." Washington, DC: Inter-American Development Bank.

rules and benefits; (viii) monitoring and evaluation of teacher quality; (ix) teacher representation and voice; and (x) school leadership. Data are collected by expert consultants who interview key informants, compile legal documents and quantitative information and complete a set of standard questionnaires.[13]

SABER-Teachers identified eight core teacher policy goals and assesses education systems according to their progress toward achieving these goals. These goals were identified through a review of the evidence and expert opinion. They are linked to teaching and learning through theory or evidence, they are a priority for resource allocation and they are actionable by governments. These goals include: (i) setting clear expectations for teachers; (ii) attracting the best into teaching; (iii) preparing teachers with useful training and experience; (iv) matching teachers' skills with students' needs; (v) leading teachers with strong principals; (vi) monitoring teaching and learning; (vii) supporting teachers to improve instruction; and (viii) motivating teachers to perform. Each goal is linked to policy levers—actions that governments can take to improve (**Figure I.2**). Levers are in turn linked to indicators, which are listed in **Table A.1** in the Annex.[14]

Figure I.2: SABER-Teachers Policy Goals and Levers

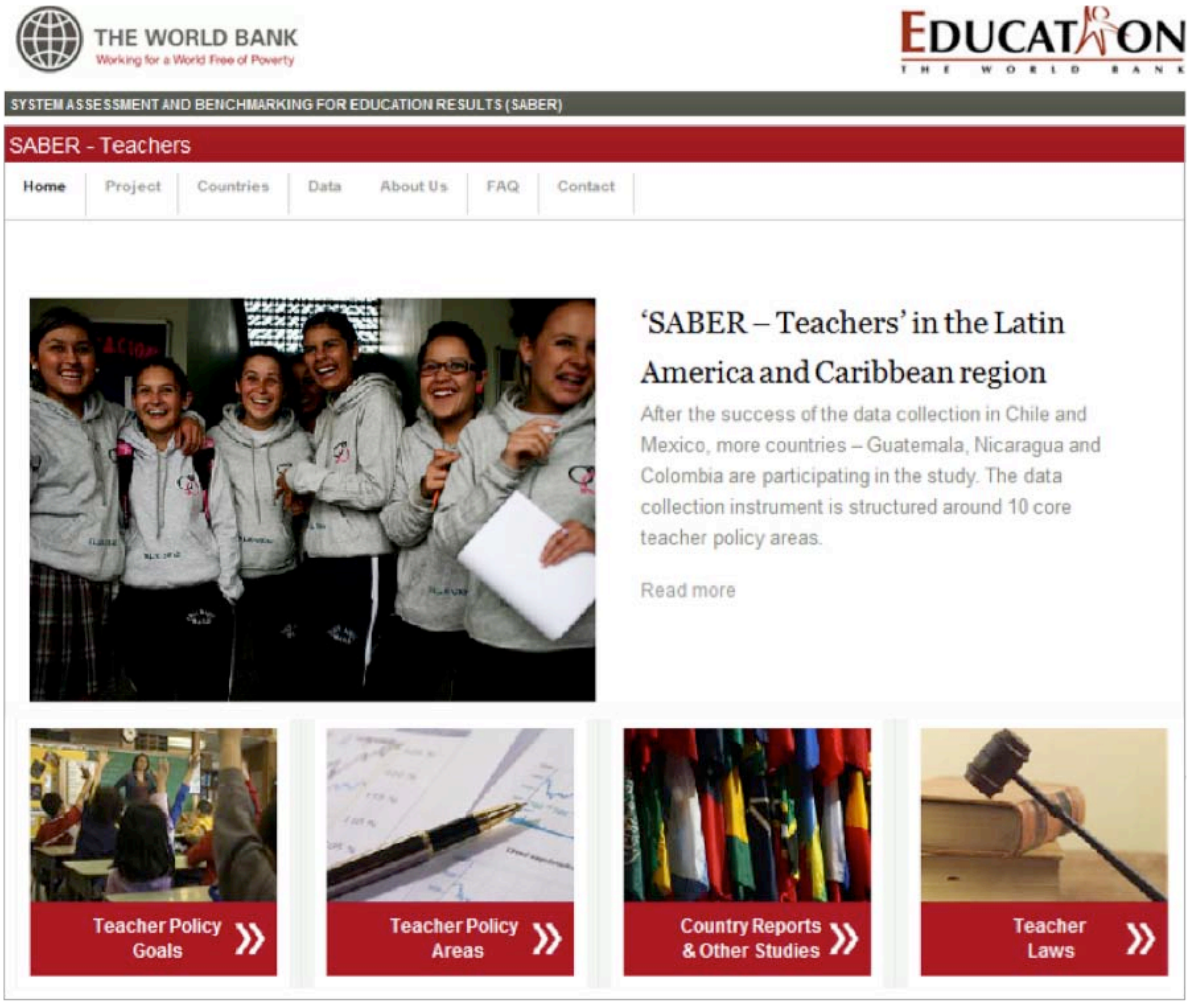
Source: Authors' elaboration.

[13] For more information on the selection of these teacher policy areas, see Vegas, E., Loeb, S., Romaguera, P., Paglayan, A. S., Goldstein, N. & Ganimian, A. J. (2011). "SABER-Teachers. Objectives, Rationale, Methodological Approach and Products." Washington, DC: The World Bank.

[14] For more information on the selection of these teacher policy goals, see Vegas, E. & Ganimian, A. J. (2011). "What Are Teacher Policy Goals, How Can Education Systems Reach Them and How Will We Know When They Do?" Washington, DC: The World Bank.

SABER-Teachers disseminates its data and analysis through user-friendly tools. An important tool is a 10-page country report, which describes how an education system is performing on each of the eight teacher policy goals and draws on the data collected on that system as well as on top- and rapidly-improving education systems to discuss the reasons behind its performance. Each report also include an overview of the key challenges of the education system, the student and teacher population, the level of (de)centralization of the education system and the profile and role of teacher organizations. A second tool, soon to be released, is a global database of all the data collected by SABER-Teachers that will allow education systems to compare its policies with those of others. In addition, the website will feature all the country reports, comparative analyses and teacher-related laws and regulations collected by SABER-Teachers (**Figure I.3**).

Figure I.3: SABER-Teachers Website



Source: Authors' elaboration.

II. Why Is There a Need to Identify Different Teacher Policy Profiles?

Teacher policies, like other policies, interact in expected and unexpected ways. Efforts seeking to derive lessons on teacher policies from high-performing and rapidly-improving education systems typically take one of two approaches. Some pick one or two particularly successful education systems (e.g., Finland and/or Singapore), outline its teacher policies and advise lagging education systems to adopt them. Others seek policy convergence among top education systems and recommend that under-performers adopt the policies on which the best systems agree.[15] While these approaches have been useful in trying to make sense of available data on the policies of successful education systems, they fail to account for the fact that teacher policies, like any other set of policies, interact: i.e., their effect depends on other policies already in place and on whether these other policies are reinforcing, offsetting or undermining the objectives of the new interventions.[16] For example, a recent study in Kenya found that, while lowering student-teacher ratios did not increase student learning, combining class size reductions with teacher accountability incentives or ability tracking led to significant increases in student learning.[17]

Yet, impact evaluation evidence on how teacher policies interact is incomplete. Ideally, one would want to have full knowledge of the ways in which teacher policies interact and use that knowledge to advise low-performing education systems on which combinations of policies they should adopt. However, the evidence on interactions between teacher policies is scarce and uneven. While policy interactions have been the subject of much study in the area of teacher compensation, where economists have sought to understand how wages interact with other non-monetary incentives to attract

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[15] For a review of such efforts, see Vegas, E. & Ganimian, A. J. (2011). “What Are the Teacher Policies of Top-Performing and Rapidly-Improving School Systems?” Washington, DC: The World Bank.

[16] See, for example: Vegas, E. & Ganimian, A. J. (2011). “Education Diagnostics: A Tool to Identify the Binding Constraints of Education Systems.” Washington, DC: The World Bank. Hausmann, R., Rodrik, D., & Velasco, A. (2006). "Growth Diagnostics." Cambridge, MA: Center for International Development, Harvard University. Vegas, E., Guáqueta, J. & Smerdon, B. (2011). “System-Wide Quality Assurance. System Assessment and Benchmarking for Education Results (SABER).” Washington, DC: The World Bank.

[17] Duflo, E., Dupas, P. & Kremer, M. (2007). “Peer Effects, Pupil-Teacher Ratios, and Teacher Incentives: Evidence from a Randomized Evaluation in Kenya.” Cambridge, MA: Abdul Latif Jameel Poverty Action Lab.

and retain effective teachers,[18] in most other areas of teacher policy, there is but a handful of ongoing experiments in which researchers have evaluated whether (and if so, how) variations on a given policy might lead to different outcomes.[19] These experiments will yield much-needed rigorous evidence on interactions between teacher policies, but their scope and focus is limited. We need a complementary approach that can both acknowledge the existence of interactions between teacher policies and offer timely policy guidance for education systems in need of improvement.

A close look at the policies of top systems can shed light on policy interactions. Successful education systems achieve the eight teacher policy goals of SABER-Teachers in different ways, but they all produce high levels of student and teacher performance. Rather than advising all low-performing education systems to adopt the teacher policies of any single country, or looking for convergence in the teacher policies of the best systems, a third approach is to look at the *combinations* of teacher policies in each top system. By mapping out the teacher policies in a top system, as well as other education and non-education initiatives that complement these policies, we can identify different "teacher policy profiles." Any system in need of improvement can then look at the different profiles that exist and decide whether it would like to follow any one in particular or a combination of two or more of them. Therefore, outlining the existing teacher policy profiles is useful both for analytical as well as operational reasons when offering policy guidance.

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[18] Boyd, D., Grossman, P., Lankford, H., Loeb, S., Wyckoff, J. (2006). "How Changes in Entry Requirements Alter the Teacher Workforce and Affect Student Achievement." Education Finance and Policy. 1(2): 176-216. Dolton, P. J. (1990). "The Economics of UK Teacher Supply: The Graduate's Decision." The Economic Journal. 100: 91-104. Dolton, P. J., & van der Klaauw, W. (1999). "The Turnover of Teachers: A Competing Risks Explanation." The Review of Economics and Statistics, 81(3), 543-552. Figlio, D. N. (1997). "Teacher Salaries and Teacher Quality." Economics Letters, 55, 267-271. Hanushek, E. A., Kain, J. F., & Rivkin, S. G. (1999). "Do Higher Salaries Buy Better Teachers?", NBER Working Paper 7082. Cambridge, MA: National Bureau of Economic Research (NBER). Hoxby, C. M., & Leigh, A. (2004). "Pulled Away or Pushed out? Explaining the Decline of Teacher Aptitude in the United States." The American Economic Review, 94(2), 236-240. Leigh, A. (2009). "Teacher Pay and Teacher Aptitude." Working Paper. Canberra, Australia: Australian National University. Murnane, R. J., & Olsen, R. J. (1990). "The Effects of Salaries and Opportunity Costs on Length of Stay in Teaching: Evidence from North Carolina." The Journal of Human Resources, 25(1), 106-124. Wolter, S. C., & Denzler, S. (2003). "Wage Elasticity of the Teacher Supply in Switzerland." Discussion Paper 733. Bonn, Germany: Institute for the Study of Labor.

[19] Banerji, R. (2011). "What Helps Children to Learn? Evaluation of Pratham's Read India program in Bihar & Uttarakhand." Cambridge, MA: Abdul Latif Jameel Poverty Action Lab. Duflo, E., Hanna, R., & Ryan, S. P. (2008). "Incentives Work: Getting Teachers to Come to School." Cambridge, MA: Abdul Latif Jameel Poverty Action Lab. He, F., Linden, L. L., & MacLeod, M. (2009). "A Better Way to Teach Children to Read? Evidence from a Randomized Controlled Trial." Cambridge, MA: Abdul Latif Jameel Poverty Action Lab. He, F., Linden, L. L., & MacLeod, M. (2008). "How to Teach English in India: Testing the Relative Productivity of Instruction Methods within the Pratham English Language Education Program." Cambridge, MA: Abdul Latif Jameel Poverty Action Lab. Kremer, M., Moulin, S., & Namunyu, R. (2003). "Decentralization: A Cautionary Tale." Cambridge, MA: Abdul Latif Jameel Poverty Action Lab. Muralidharan, K., & Sundararaman, V. (2009). "Teacher Performance Pay: Experimental Evidence from India." NBER Working Paper 15323. Cambridge, MA: National Bureau of Economic Research (NBER).

III. How Did SABER-Teachers Identify Different Teacher Policy Profiles?

SABER-Teachers relied on its previous analytical work to identify the top systems. In a previous paper, SABER-Teachers identified top-performing and rapidly-improving education systems using the most complete and up-to-date database on international student achievement tests.[20] These systems were classified into four groups **(Figure III.1)**.

Figure III.1: Successful Education Systems Identified by SABER-Teachers

Group A: Top-performing and rapidly-improving education systems	Group B: Top-performing education systems	Group C: Rapidly-improving education systems (long term)	Group D: Rapidly-improving education systems (short term)
Hong Kong (China)	Japan	Chile	Ghana
Canada	Taipei (China)	Iran	Armenia
Finland	Hungary	Luxembourg	Lebanon
Belgium	Singapore	Israel	Mexico
South Korea	Netherlands	New Zealand	Indonesia

Focus for this paper

Source: Authors' elaboration.

In identifying the different existing teacher policy profiles, SABER-Teachers focused exclusively on Groups A and B (i.e., on the education systems that are already high performers, rather than on those that are getting better results but have not yet achieved high performance) for two main reasons. First, the purpose of the teacher policy profiles is to offer systems in need of improvement some empirically-informed options on what their teacher policy systems would eventually need look like to achieve excellence, rather than on the transformations that might be necessary in the process. Second, rapidly-improving systems are constantly reforming their teacher policy systems, so a "snapshot" of what their teacher policies at any point in time is likely to offer little policy guidance. It should be also noted that while there was not enough information on all education systems in Groups A and B, SABER-Teachers focused on those for which there were sufficient available data.

SABER-Teachers used case studies and benchmarking reports to categorize the best education systems into four teacher policy profiles, which differ according to the degree of government involvement in managing the teaching profession. The

[20] Vegas, E. & Ganimian, A. J. (2011). "What Are the Teacher Policies of Top-Performing and Rapidly-Improving School Systems?" Washington, DC: The World Bank.

SABER-Teachers team reviewed the reference materials both to identify the different teacher policy profiles that existed among the best education systems and to match each system with a profile (or with a combination thereof).[21] **Table A.1** in Appendix A lists all the materials used for this analysis. Based on the sample of education systems reviewed, SABER-Teachers identified four teacher policy profiles: (a) professional autonomy; (b) shared responsibility; (c) career development; and (d) performance management. These profiles are a stylized and, in some cases, simplified version of a more complex set of teacher policies; we do so intentionally to facilitate understanding the key features that drive teacher management efforts in each profile.

a. Professional Autonomy: These teacher policy systems are particularly effective at selecting the best individuals into teaching and preparing them exceptionally. Therefore, once teachers enter the profession, the system grants them ample discretion to decide how to best achieve high performance and focuses on supporting their work rather than on trying to steer it in any particular direction.

b. Shared Responsibility: These teacher policy systems also place considerable trust on teachers. Yet, they are built around the notion that excellent teaching is not the responsibility of any single instructor, but rather of the profession as a whole. Consequently, they have in place mechanisms that foster collaboration and encourage teachers to hold their peers accountable for the quality of their work.

c. Career Development: These teacher policy systems are not satisfied with having rigorous standards for entry into teaching. They continue to build teachers' capacity throughout their careers, providing them with induction, professional development and formative assessment and making sure to recruit the best teachers to serve as principals, so that they may become effective instructional leaders.

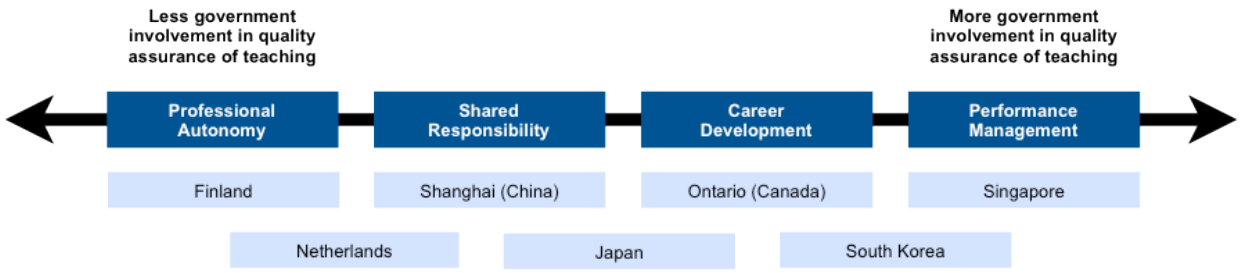
d. Performance Management: These teacher policy systems are characterized by having a tight control over teachers' daily work in the classroom. They provide teachers with detailed guidelines for their work, they monitor their execution closely and they use multiple incentives to reward outstanding teaching as well as accountability mechanisms to tackle low teacher effort and performance.

These profiles differ in the extent to which the government is involved in ensuring all teachers perform at high levels. In fact, the profiles can be placed along a continuum that describes the degree of government involvement in quality assurance (**Figure III.2**). Broadly speaking, a gradual movement from a professional autonomy profile at one end of the continuum to one of performance management at the other implies a more active role

[21] For this analysis, the authors were strongly influenced by previous work on system-wide quality assurance by Vegas, E., Olchefske, J., Walters, A., Molina, E. & Cedrán Infantes, P. (2007). "Chile: Institutional Design for an Effective Educational Quality Assurance." Washington, DC: The World Bank.

for the government—and consequently, a more reactive role for teachers—in this process. Certainly, no education system fits perfectly into any of these profiles, but as Figure III.2 indicates, some systems exemplify a profile while others combine elements of two contiguous profiles. In fact, top-performing education systems span the whole continuum, suggesting that no teacher policy profile is more desirable than the others.

Figure III.2: Government Involvement in Quality Assurance of Teaching



Source: Authors' elaboration.

SABER-Teachers studied the four education systems that exemplify each profile. As Figure III.2 above shows, Finland, Shanghai (China), Ontario (Canada) and Singapore are emblematic of the four teacher policy profiles. Therefore, SABER-Teachers studied these four systems in detail to get a better sense of the specific policies that they have in place. This exercise was particularly helpful to understand what systems in each profile do to reach the eight policy goals in Figure I.2 above. For each exemplary system, SABER-Teachers looked at: (i) the teacher policies that distinguish each system; (ii) other (i.e., non-teacher) education policies that support teachers' work; and (iii) other factors—both within and beyond government control—that help explain why the system works. The rationale for taking this comprehensive view at each of the four systems is that it will help systems in need of improvement realize of everything that is needed to achieve high performance in each of the different profiles and chart its improvement journey accordingly.

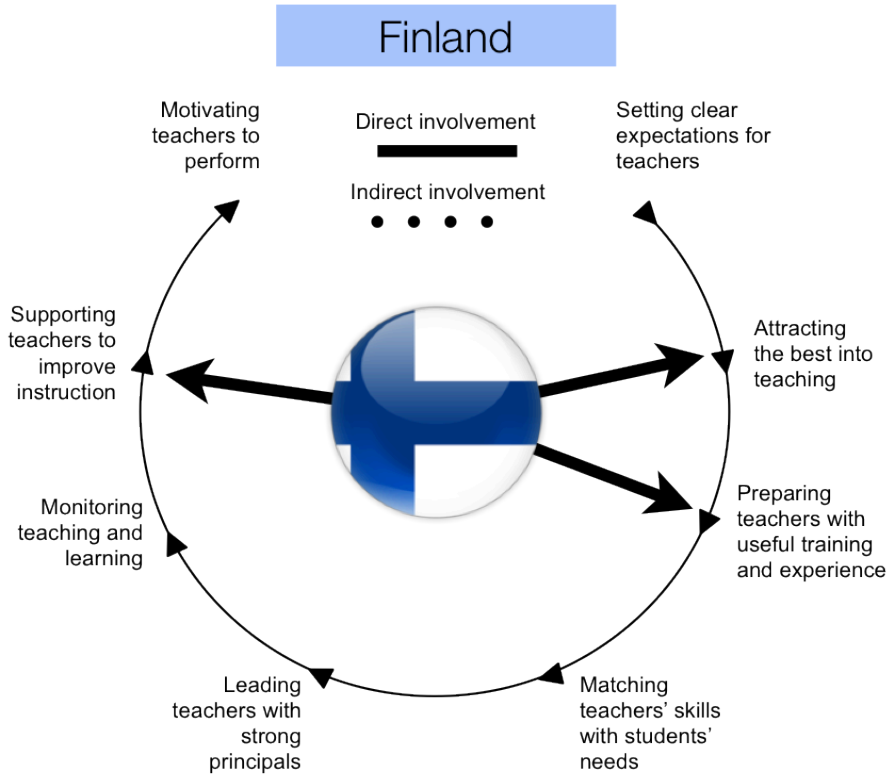
a. Finland: Professional Autonomy[22]

The role of the Finnish government in the quality assurance of teaching is rather limited. **Figure III.3a** outlines the SABER-Teachers policy goals and shows the

[22] This section draws heavily on: Darling-Hammond, L. (20110). "Steady Work: How Countries Build Successful Systems." In Darling-Hammond, L. (2010). The Flat World and Education: How America's Commitment to Equity Will Determine Our Future. New York, NY: Teachers College. Schwartz, R. & Mehta, J. (2011). "Finland: Slow and Steady Reform for Consistently High Results." In OECD (2011). Strong Performers and Successful Reformers in Education. Lessons from PISA for the United States. Paris, France: Organisation for Economic Co-operation and Development (OECD). Tucker, M. S. (2011). "Standing on the Shoulders of Giants. An American Agenda for Education Reform." Washington, DC: National Center for Education and the Economy.

degree of government involvement in each of these areas: (i) a solid arrow means that the government (at any level) is directly involved in this policy goal; (ii) a dashed arrow means that the government is indirectly involved in this policy goal; and (iii) the absence of an arrow means that, while the government might do something in a given goal, it is not particularly active in it. As the figure shows, the Finnish government focuses on doing quality assurance early in teachers' careers, by recruiting top candidates and preparing them outstandingly, and then limits itself to supporting teachers' work. The underlying theory of action in Finland is that if a system attracts talented individuals into teaching and equips them with the tools they need to succeed in the classroom, they will know better than anyone how to do their job and the government should limit itself to supporting their work.

Figure III.3a: Degree of Government Involvement in the Quality Assurance of Teaching in Finland



Source: Authors' elaboration.

Characteristic Teacher Policies of the System

High standards for entry into teaching. Entry into the teaching profession in Finland is highly competitive. When teacher education was moved from *seminaria* (teacher colleges) to universities in 1979, the profession became a lot more selective.

At present, applicants to initial teacher training programs in Finland must successfully undergo two screening processes to gain admissions. First, they have to complete an application, which is reviewed to ensure that they: (i) scored highly on the National Matriculation Exam; (ii) have a high grade point average on their high school transcript; and (iii) have a strong record of out-of-school accomplishments. Then, those who are selected from this stage must: (i) take a written exam on assigned books in pedagogy; (ii) give a sample lesson where they need to demonstrate social interaction and communication skills; and (iii) participate in an interview where they are asked, among other things, why they want to be teachers. While other systems may have similar processes, in Finland, they are very rigorous: Only one in ten applicants are admitted into initial teacher training and they are drawn from the top 20% of their graduating high school class.[23]

Rigorous initial teacher training. There are at least four aspects that make Finland's initial teacher training rigorous. First, it places a strong emphasis on teachers developing subject-specific pedagogical knowledge. In primary, teachers major in education, but they minor in two curricular areas and take classes with peers who major in these areas (i.e., they take math classes in the math department, not in the education department). In secondary, teachers major in the subject area that they teach and do additional work on pedagogy. Second, initial teacher training is research-based: in fact, all teachers are required to write a research dissertation. Third, all teachers are trained in how to diagnose and adapt their instruction for children with special education needs. Fourth, initial training has a strong clinical (practice-based) component: Finnish teachers spend a full year in model schools associated with their university, where they participate in "problem-solving groups." Interestingly, the only way to become a teacher in Finland is to get a university degree in teaching. Even individuals with a master's in a discipline that they would like to teach must get another master's in teaching, which is the level at which all teachers are trained. In this way, Finland makes sure that teachers not only know their discipline well but that they also know how to teach it. Yet, while much has been made about the fact that all Finnish teachers are required to obtain a master's degree, the characteristics of the training programs outlined above seem to offer a much more useful insight into their preparation than the level at which it occurs.

Ample pedagogical discretion for teachers. Finnish teachers have considerable autonomy over what and how to teach. The country has a national core curriculum,

[23] Interestingly, while high compensation is often widely believed to be essential for recruiting top talent, Finland manages to pay their teachers well enough, but less than most other top performers. This is probably due to two reasons: first, salaries for most occupations are very similar in Finland and second, the social status of the profession is already quite high in that country. Given its unique circumstances, Finland may not be the best education system from which to draw lessons on the compensation front.

but it has become increasingly less detailed and prescriptive in the past 20 years.[24] Teachers are free to select their own learning materials and design their own lessons. The external tests conducted by the National Board of Education are sample-based and geared towards gauging the overall performance of the system; they are not designed for accountability purposes. Yet, teachers are expected to regularly conduct diagnostic and formative assessments in their classrooms, following the assessment guidelines provided by the curriculum and the textbooks. In short, the Finnish system places a considerable amount of trust in teachers because it is confident that they have the skills they need to be excellent instructors.

Multiple specialists supporting teachers' work. Finnish teachers are not the only ones working to ensure students learn. Every school in Finland has a "special teacher" who works with regular teachers to identify children with special learning needs and to address their needs, either individually or in small groups. Additionally, every school has a "pupil's multi-professional care group" composed of the principal, the "special teacher," the school nurse, the school psychologist, a social worker and regular teachers. This group periodically reviews the performance of every classroom and identifies students in need of additional support. If a student needs services beyond those provided at school, the group helps the family get this support. Therefore, even if Finnish schools have outstanding teachers, they also have many other professionals working to ensure students have an equal opportunity to learn.

Other Education Policies that Support Teaching

Full-service schools. Finnish schools provide much more than good education. They offer multiple services to students, including a daily meal, health and dental services, guidance and psychological counseling, as well as access to other services for students and their families. Importantly, none of these services are need-based; they are available to all students. Thus, while good teaching is a priority in Finland, it is not expected to compensate for disadvantages in the student population. Rather, Finnish schools do as much as they can to offset these disadvantages so that teachers can concentrate on providing excellent instruction.

Other Factors that Make this System Work

High degree of parental involvement. While Finland lacks the formal accountability policies that characterize many Western educations systems, Finnish parents closely monitor the progress of their children at school and alert teachers when they discover any problems. Schools also have frequent parent-teacher

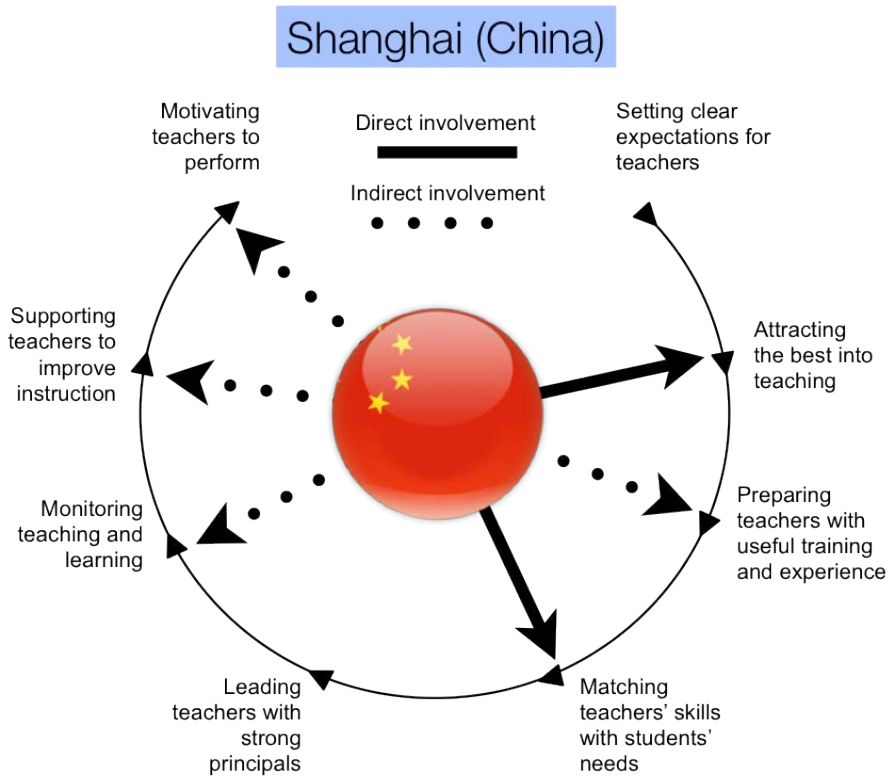
[24] Tucker, M. S. (2011). "Standing on the Shoulders of Giants. An American Agenda for Education Reform." Washington, DC: National Center for Education and the Economy.

meetings geared towards assessing class-wide as well as individual issues. This policy serves to reinforce the already-existing parental commitment to education.

b. Shanghai (China): Shared Responsibility[25]

The Chinese government in general, and that of Shanghai in particular, is more involved than the Finnish government in the quality assurance of teaching. Yet, as **Figure III.3b** shows, most of government involvement is indirect: it creates the mechanisms for teachers to support their peers and hold them accountable, but it rarely does so directly. In fact, just like in Finland individual teachers do most of the quality assurance, in Shanghai groups of teachers do most of the quality assurance. The underlying theory of action in China is that no individual teacher is perfect but that capable teachers can help each other improve, so the role of the government should be to create the spaces and mechanisms for teachers to work together.

Figure III.3b: Degree of Government Involvement in the Quality Assurance of Teaching in Shanghai (China)



[25] This section draws heavily on: Cheng, K. (2011). "Shanghai and Hong Kong: Two Distinct Examples of Education Reform in China." In OECD (2011). Strong Performers and Successful Reformers in Education. Lessons from PISA for the United States. Paris, France: Organisation for Economic Co-operation and Development (OECD). Tucker, M. S. (2011). "Standing on the Shoulders of Giants. An American Agenda for Education Reform." Washington, DC: National Center for Education and the Economy.

Source: Authors' elaboration.

Characteristic Teacher Policies of the System

Early recruiting and government-funded training. Much like Finland, China strives to ensure that it attracts the very best into the teaching profession. In Shanghai, the government has not only waived the requirements for tuition for initial teacher training programs, but it also offers early admissions to the most promising students to make sure it gets them before others do. While teacher pay in China is not particularly high, teachers know that they can make a considerable amount of additional money through tutoring and that they can receive generous bonuses from working in rural areas. This combination of policies has made teaching the second or third most popular career in China in recent years.

Collaborative lesson planning. Like Finland, China places a great deal of trust on the capacity of its teachers. Yet, unlike Finland, China also invests considerable resources in mechanisms geared towards fostering collaboration among teachers to encourage peer-to-peer learning and accountability. The "teaching-study groups" are a clear example of such mechanisms. These groups bring together teachers of the same subject and level so that they can jointly plan their lessons for each week. Yet, the quality assurance in lesson-planning is not entirely left to teachers. All "teaching-study groups" are supervised by a "teaching-study office" in the Education Bureau at the rural country or district level and each of these offices is supervised by a similar agency at the Education Department at the provincial or municipal level. In Shanghai, teachers have access to a web-based platform with resources for curriculum development and learning, success stories of curriculum implementation and research papers that facilitates the sharing of good practices among teachers.

Peer-to-peer classroom observations. Collaboration among Chinese teachers goes beyond lesson-planning. In fact, teachers' workload in China is structured so that teachers can regularly observe their peers during actual lessons. Peers observe each other to learn how to best teach a new topic in the curriculum, new teachers observe more seasoned instructors to learn from them through apprenticeships, master teachers observe almost every lesson that new teachers give during their first year of experience for mentoring purposes and principals observe teachers for monitoring or professional development purposes. In fact, in order to be promoted,

teachers are required to conduct "public lessons" (i.e., demonstration lessons), which are attended by their peers, who offer constructive feedback to improve.[26]

Reassignment of teachers and principals. Shanghai understands that there are several reasons why the best teachers and principals do not always end up where they are most needed. Therefore, the government not only reassigns outstanding personnel from urban to rural schools. It also gives young principals in hard-to-staff schools the opportunity to do a "residency" in a high-performing school, learn new experiences and return to its original school with ideas on how to improve. These two policies are emblematic of the belief, deeply embedded in the Chinese system, that teachers and principals can benefit from working alongside outstanding peers.

Other Education Policies that Support Teaching

The role of high-stakes exam. University entrance examinations have considerable influence over teaching and learning in China—especially, at the secondary school level. Untested subjects are typically removed from the timetable, the long schooldays focus mainly on exam material and students often have to attend school on the weekends for test preparation.[27] In addition, there is a thriving industry of private (often, for-profit) tutorials devoted entirely to ensure students succeed in exams. In Shanghai, it is estimated that about 80% of parents send their children to tutorial schools in the "remedial system"—even when children are performing well already. The preeminence of exams is important for at least two reasons. First, it suggests that the performance of Chinese students in international exams might not only be a function of their outstanding teachers, but also of the clear incentives that they have to master the materials covered in similar exams at home. Second, it partly explains why the Chinese government can afford to be relatively "hands off" in terms of teacher accountability: because the pressure to get students to do well in their exams is so high there is little else the government could do to increase teacher motivation; the incentives are already built into the system.[28]

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[26] This practice is similar to that of the "lesson study" in Japan (a mixed system that combines features from the shared responsibility and career development profiles). See Tucker, M. S. & Brown Ruzzi, B. (2011). "Japan: A Story of Sustained Excellence." In OECD (2011). Strong Performers and Successful Reformers in Education. Lessons from PISA for the United States. Paris, France: Organisation for Economic Co-operation and Development (OECD).

[27] In fact, in many Chinese areas including Shanghai, homework associated with exam preparation became such a burden to students that local authorities had to impose a maximum amount of homework (in hours) that schools were allowed to assign.

[28] For more reasons about why the role of these exams is important in influencing the quality of education, see Tucker, M. S. (2011). "Standing on the Shoulders of Giants. An American Agenda for Education Reform." Washington, DC: National Center for Education and the Economy.

Targeted intervention in low-performing schools. Over the past decades, Shanghai has periodically taken stock of the infrastructure and teaching and learning quality of schools and intervened in those that failed to meet minimum standards. In recent years, this has been done through a school accountability system that assigns grades to schools (A through D) and targets those with the lowest performance. Interventions range from upgrades in school infrastructure, to changes in the school personnel and even school closures. These targeted interventions have, in turn, been complemented by universal policies of fee abolition and free textbook provision for all students. While Shanghai does not have an accountability mechanism for all teachers, this policy allows the government to intervene in the event of low teacher performance.

Partnerships between districts and schools. The Chinese belief in the potential of collaboration to improve practice transcends the teaching profession. In recent years, Shanghai began "pairing off" urban and rural districts so that they may team up to address specific challenges, such as teacher capacity-building. Additionally, Shanghai is "commissioning" high-performing public schools to take over the administration of those that are lagging. Under this program, the deputy leader and a team of experienced teachers from the "strong" school are lent to the "weak" school, so that the latter may capitalize on their expertise to tackle their problems. This is yet another policy that helps level the playing field and foster collaboration among peers.

Other Factors that Make this System Work

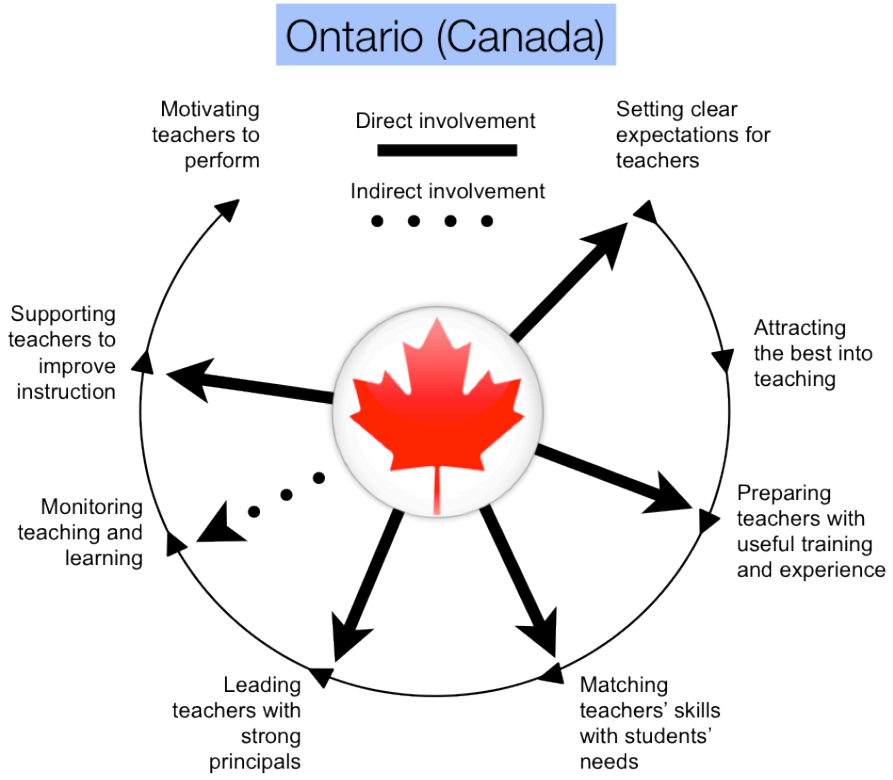
Social capital as an accountability mechanism*.* To a great extent, the reason why peer-to-peer collaboration both equalizes standards of instruction and encourages horizontal accountability is that in China, much like in other countries with similar systems such as Japan, individuals (and teachers are no exception) attach considerable importance to what their peers think of their performance—perhaps, even more than they would care about a monetary bonus or a promotion.[29] To disappoint one's peers carries significant consequences in these societies, so teachers will work hard not to do so. It is not entirely clear that this collaborative system would have the same effects in countries where social and cultural norms differ considerably.

[29] See Tucker, M. & Brown Ruzzi, B. (2010). "Japan: A Story of Sustained Excellence." In OECD (2010). Strong Performers and Successful Reformers in Education. Lessons from PISA for the United States. Paris, France: Organisation for Economic Co-operation and Development (OECD). Tucker, M. S. (2011). "Standing on the Shoulders of Giants. An American Agenda for Education Reform." Washington, DC: National Center for Education and the Economy.

c. Ontario (Canada): Career Development[30]

The role of the Canadian government in general, and that of Ontario in particular, focuses on how to build the capacity of teachers, rather than on selecting the best (even if it influences the attractiveness of teaching by setting and enforcing high standards for the profession). As **Figure III.3c** shows, the government is most active in the initial preparation, induction, appraisal and support of teachers. The underlying theory of action in Canada is that it is easier to train a good teacher than to pick one, so the government should focus on training and supporting teachers once they enter the profession.

Figure III.3c: Degree of Government Involvement in the Quality Assurance of Teaching in Ontario (Canada)



Source: Authors' elaboration.

[30] This section draws heavily on: Pervin, B. & Campbell, C. (2011). "Systems for Teacher and Leader Effectiveness and Quality: Ontario, Canada." In Darling-Hammond, L. & Rothman, R. (Eds.) (2011). Teacher and Leader Effectiveness in High-Performing Education Systems. Washington, DC: Alliance for Excellent Education and Stanford, CA: Stanford Center for Opportunity Policy in Education. Schwartz, R. & Mehta, J. (2011). "Ontario, Canada: Reform to Support High Achievement in a Diverse Context." In OECD (2011). Strong Performers and Successful Reformers in Education. Lessons from PISA for the United States. Paris, France: Organisation for Economic Co-operation and Development (OECD).

Characteristic Teacher Policies of the System

Common standards for all teachers. Ontario understand that it is pivotal that all teachers meet minimum standards. The Ontario College of Teachers (OCT), established in 1997, not only sets standards of practice and conduct for teaching (which includes accrediting initial teacher training programs according to 15 criteria), but also investigates complaints against teachers from the public. The OCT fulfills an essential role in ensuring that teachers feel part of a community of professionals.

Strong clinical component in initial teacher training. Ontario recognizes the importance of student teachers getting some direct classroom experience before they are put in charge of their own classrooms. This is why it requires all teachers to complete at least 40 days of practice teaching in order to graduate—in fact, most initial teacher training programs offer between 50 and 60 days of practice. This ensures that teachers have a smooth transition from their studies into their first job.

Robust induction for novice teachers. Ontario's extensive support system for teachers begins on the first day on their job. The province requires all public school teachers to participate in the New Teacher Induction Program (NTIP), which includes orientation, mentoring, professional development (which focuses on common problem areas for new teachers, such as classroom management, communication with parents, assessments and evaluation) and two performance appraisals conducted by the school principal. In this way, Ontario makes sure that teachers are not left to "sink or swim" in their first position, but that they can adjust quickly to their new work environment and get all the additional support they need to succeed. Evaluations have noted that the NTIP has been effective in retaining new teachers: more than 90% of new teachers in 2008 returned to their schools the following year.

Frequent formative teacher appraisals. Ontario, much like Singapore (see below) evaluates its teachers periodically. However, unlike teacher evaluations in Singapore, those in Ontario are more geared towards improving teacher practice than towards holding teachers accountable. After a brief experiment with a test for teachers, the province transitioned into appraisals that aim at improving instruction (even if in a small number of cases persistently low performance has led to teacher dismissals). Teachers are appraised every five years by the school principal against the standards of practice set out by the OCT (there are 8 competencies for new teachers and 16 competencies for experienced teachers). In this way, Ontario can ensure that its standards for the profession are consistently enforced.

Self-directed hands-on professional development. Ontario invests considerable resources in professional development to improve teacher practice. There are two

main efforts on this front: (i) the Teacher Learning and Leadership Program (TLLP) program, which allows experienced teachers to share best practices through self-directed, job-embedded projects; and (ii) the Additional Qualifications (AQ) program, which enables all teachers to upgrade their qualifications to enhance their practice. The TLLP is fully funded by the government, while the AQ is funded by teachers. However, participation in the latter is quite high: more than 35,000 teachers get AQs every year; in 2008 teachers spent $25 million of their own money in this program. In addition, Ontario allocates six days every year for teachers and principals to work with each other on activities related to ministry priorities and school needs.

Mechanisms to ensure principal quality. Ontario has many mechanisms to ensure there is a qualified principal in every school. First, it requires all of its principals to have a bachelor's degree, five years of classroom experience and a graduate degree. Second, it trains all principals following the same standard: the Ontario Leadership Framework (OLF). The training program for principals, called the Principals' Qualification Program (PQP), is accredited by the same agency that accredits initial teacher training programs, the OCT. Third, while school boards are responsible for hiring principals, they receive funds and guidance from the ministry to develop a mandatory leadership succession and talent development plan based on effective hiring practices. Fourth, once principals are hired, they are mentored during their first two years of service. And finally, all principals are appraised every five years through the Principal Performance Appraisal (PPA) process, which is a mechanism that evaluates principals based on the goals they set jointly with their supervisors. These evaluations have clear consequences: unsatisfactory performance can lead to demotions, transfers or employment termination.

Other Education Policies that Support Teaching

Policy coherence across provinces. In spite of being a federal country, Canada actually has fairly consistent standards for student and teacher performance across its ten provinces. In part, this has been due to much "borrowing" across states: many provinces use the same textbooks, the same initial teacher training programs and the same general structure for the education system. Yet, this has also been partly the product of deliberate policy coordination across the provinces. This coordination mainly takes place through the Council of Ministers of Education (CMEC), which shares information and good practices across provincial systems. Federal systems looking to follow Canada's steps would be well-advised to understand whether they have similar arrangements that allow for such coordination.

Other Factors that Make this System Work

Strong national welfare state. Part of the reason for Ontario's success may lie in Canada's strong welfare system. While Canada has relatively high poverty rates by

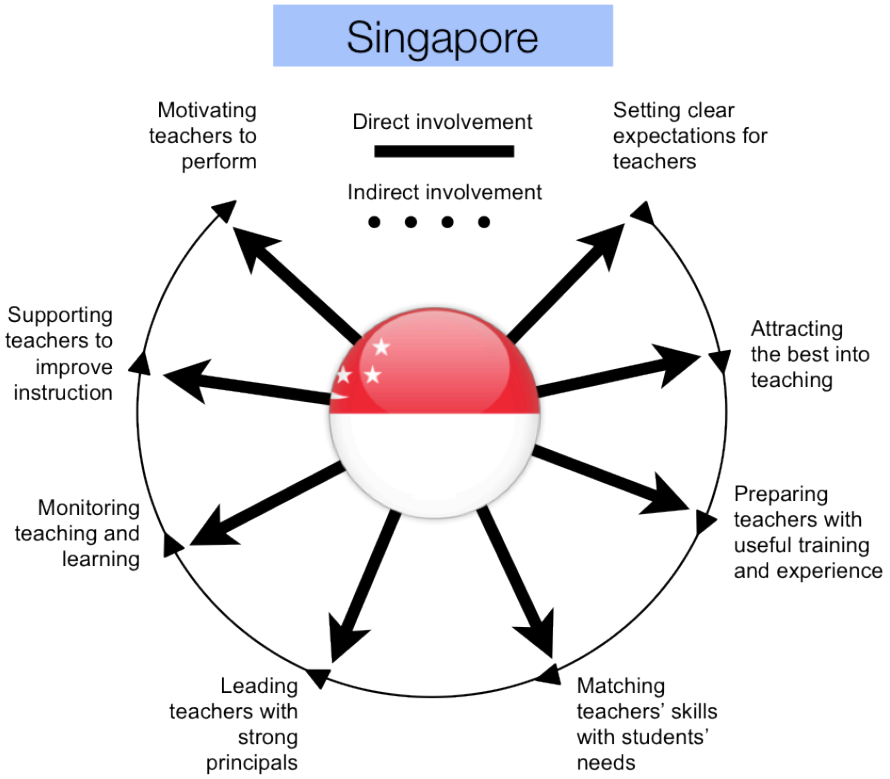
international standards, the child poverty rates of each province in the country are highly predictive of its performance in international assessments. Many believe that the wide reach of the welfare state in Canada both ameliorates the impact of poverty on student achievement but also generates a culture of trust between the government and teachers, since the latter tend to believe that the state does its part to ensure all students have the necessary conditions they need to learn.

d. Singapore: Performance Management[31]

The Singaporean government leaves nothing to chance when it comes to ensuring the quality of instruction in its schools. As **Figure III.3d** shows, it intervenes directly at every step of a teacher's career—often, in more than one way (e.g., motivating teachers not only with monetary bonuses, but also with promotion opportunities). The underlying theory of action in Singapore is that the government knows how to get excellent teachers and is capable of doing so, so that it should be involved at every stage of the teacher pipeline to ensure teaching quality is of the highest caliber.

Figure III.3d: Degree of Government Involvement in the Quality Assurance of Teaching in Singapore

[31] This section draws heavily on: McKinsey & Co. (2007). How the World's Best-Performing School Systems Come Out on Top. London, UK: McKinsey & Co. Stewart, V. (2011). "Singapore: Rapid Improvement Followed by Strong Performance." In OECD (2011). Strong Performers and Successful Reformers in Education. Lessons from PISA for the United States. Paris, France: Organisation for Economic Co-operation and Development (OECD). Tucker, M. S. (2011). "Standing on the Shoulders of Giants. An American Agenda for Education Reform." Washington, DC: National Center for Education and the Economy.



Source: Authors' elaboration.

Characteristic Teacher Policies of the System

Early recruiting and fine screening. Just because Singapore's government is more involved than others in ensuring the quality of teaching does not mean that it does not seek to recruit the best and brightest into the profession. In fact, Singapore starts recruiting early, purposefully identifying and whetting the appetite of high school students in the top third of their graduating high school class for teaching through internship opportunities. Yet, Singapore goes beyond recruiting: it also has demanding screens in place to ensure that only the best make it into the profession. Singaporean teachers have to score at least at the average level on the rigorous "A Level" exams or obtain a polytechnic degree, which is equivalent to a high-level college degree in the United States. Then, all candidates must undergo an interview conducted by a faculty panel of the only initial teacher training school in the country: the National Institute of Education (NIE). Only 1 in 8 applicants are admitted into initial teacher training and they are drawn from the top 30% of their graduating class.

Management of teacher demand and supply. Singapore knows that mismatches between the demand and supply for teachers can hurt teaching in at least two ways. First, they can diminish the appeal of the profession, since an oversupply of teachers invariably means that not all who graduate from initial teacher

training will get a job, thus making the career less appealing to talented candidates. Second, they can lead to an inefficient use of resources, since without any barriers to entry, public funds would be stretched over all potential teachers instead of being invested in those with the greatest promise. This is why Singapore restricts entry into the profession before individuals begin training to match the eventual demand and can afford to pay for the training of all students and offer them a competitive stipend. The government makes sure that it will recover its investment in these individuals by requiring them to commit to teach for at least three years upon graduation.

Tightly controlled initial teacher training. Much like in Finland before the 1970s, teachers in Singapore used to be trained in a college with a relatively low status. Yet, much like Finland, Singapore was able to raise the rigor of its initial teacher training. First, it replaced the previous college with the NIE, which became the only teacher training institution in the country. This has made it relatively easy for the government to monitor the quality of the training provided. Second, it aligned initial teacher training not only with the national curriculum, but also with the work of associated schools, where all new teachers are mentored in their first few years. Third, it required that all teachers (from art to science) be taught by the same faculty members. This solves the problem of having different standards and prestige for different teaching careers, which troubles many education systems. Finally, it recently incorporated the NIE into Nanyang Technological University, a top tier institution. This has improved the quality of NIE's standards and faculty—and thus its prestige.

Evaluation against absolute and relative benchmarks. Singaporean teachers are subject to three types of evaluations. Annually, they are evaluated against 16 competencies in the Enhanced Performance Management System, including their contribution to their students' academic and character development, their collaboration with parents and community groups and their team work with colleagues. Additionally, each school conducts a self-evaluation every year against its own goals in nine functional areas, five "enablers" and four areas of academic performance. Finally, all schools are assessed externally by the School Appraisal Branch of the Ministry of Education every six years. Having these multiple evaluations allows Singapore to identify and address under-performing teachers.

Meaningful professional development. Singapore knows that even excellent teachers can and should continuously improve their practice. Thus, all Singaporean teachers are required to complete 100 hours of professional development per year. These can be spent obtaining advanced degrees on subject matter and pedagogy at the NIE or on school-based initiatives that focus on identifying teaching-related problems at a school and introduce new practices to solve them. Schools also have their own funds to support additional professional development for their teachers, which can even pay for teachers to spend time abroad and acquire new practices. Like China, Singapore has created spaces for teacher collaboration, such as teacher

networks and professional learning communities, but it does not rely solely on these to promote peer-to-peer learning or to hold teachers accountable.

Different career paths for teachers with different abilities. Singapore offers teachers opportunities to move forward in their careers that are tailored to their skills. Upon entering the profession, teachers can choose among three career ladders: (i) the "teaching track," which includes the positions of senior teacher, lead teacher, master teacher and finally, principal master teacher; (ii) the "leadership track," which includes the positions of subject/level head, head of department, vice principal, principal, cluster superintendent, deputy director, director and finally, director-general of education; and (iii) the "senior specialist track," which can lead to a specialization in various areas within the Ministry of Education, including curriculum and instructional design or education research and statistics. For each career track, Singapore has designed distinct training programs. Every step implies a salary increment, so teachers are evaluated thoroughly before they go on to the next one. These opportunities ensure not only that teachers remain motivated, but also that they do not feel that they need to leave the classroom to advance in their careers.

A rigorous career path for principals. As stated above, school principals have their own career path in Singapore. Candidates for principal positions have to undergo: (i) a six-month training program, which requires them to take course work on administration; (ii) supervised practice, in which the potential of the candidates for management positions is assessed against a series of competencies delineated by the government; and (iii) two mentorship sessions, in which aspiring principals shadow exemplar principals, hand-picked by the Ministry of Education for their outstanding leadership skills. The process is mediated by a faculty member at NIE. In this way, Singapore makes sure that principals have both the skills and the tools they need to excel at acting as instructional leaders.

Strategic use of teacher compensation. Singapore understands that pay is an important tool to attract, retain and motivate its teachers. This is why it continuously monitors compensation in other professions and adjusts teachers' wages to ensure teaching remains as attractive as other jobs typically chosen by talented graduates. While teacher pay remains relatively flat throughout teachers' careers, Singapore offers generous bonuses to high-performing teachers. In this way, instead of retaining all teachers, the government focuses on keeping only the best.

Other Education Policies that Support Teaching

World-class standards. To a great extent, Singapore's educational success is due to the rigorous standards set by its Primary School Leaving Examination, as well as its O- and A-levels, which are the same anywhere in the world. Further, it has a national core curriculum with a strong emphasis on core subjects, such as math,

science and literacy in two languages. This curriculum is accompanied by various materials that prescribe how to teach each subject, which are in turn well-aligned with initial teacher training courses.

Other Factors that Make this System Work

The country's small size. Adopting a Performance Management profile can be quite taxing for an education system, since the government has to do several things and do them effectively. In the case of Singapore, the fact that the education system is very small—with only 522,000 students and 360 schools—explains why the country is well-suited for this type of teacher management system. This does not mean that all small education systems should follow Singapore's steps, or that large education system should not. Rather, it suggests that systems looking to emulate Singapore should consider whether they possess similar advantages to face the challenges that this capacity-intensive approach to teacher quality requires.

Highly competent civil service. Another factor that makes Singapore well-equipped to carry out all the tasks that a Performance Management profile demands is the fact that it has an extremely competent civil service. Like teachers, civil servants are carefully recruited, well-trained (often at the best universities in the world), pragmatic, hard-working and well-remunerated. Additionally, civil servants pay close attention to international best practices and they are used to bringing data and evidence to bear to make decisions. If any civil service can take up the challenge of managing teachers at every stage of the pipeline, it is the Singaporean civil service. Other education systems looking to emulate Singapore would be well-advised to assess whether their civil service meets these standards.

An analysis of the main characteristics of systems that exemplify each teacher policy profiles sheds light on how they reach the SABER-Teachers policy goals. Having identified the teacher policy profiles and studied education systems that best exemplify them, we now map out what systems in each profile do to achieve the teacher policy goals outlined in Figure I.2 above. This was deemed useful not only to get a better understanding of the characteristics of systems in each profile, independently from their particular representations in a given country, but also to help systems in need of improvement to have learn more specifically about the reform journey they would need to undertake if they were to follow any of these profiles. **Table III.1** below shows what systems in each profile do to reach the SABER-Teachers policy goals. As the table shows, as we move from one end of the continuum in Figure III.2 above to the other, we can see that the role of the government in the quality assurance of teachers grows larger. Yet, it is also important to note that even systems in the less government-intensive models are quite involved in some SABER-Teacher policy goals—especially, when those are the ones in which they rely to ensure the quality of instruction (see Figures III.3a-III.3d above).

Table III.1: Degree of Government Involvement in Each Policy Goal under Alternative Teacher Policy Profiles

1. Setting clear expectations for teachers			
Professional Autonomy	**Shared Responsibility**	**Career Development**	**Performance Management**
• Outlines content in national curriculum and/or learning standards	• Outlines content in national curriculum and/or learning standards • Shapes the content of textbooks associated with the curriculum	• Outlines content in national curriculum and/or learning standards • Shapes the content of textbooks associated with the curriculum • Aligns the curriculum with initial teacher training	• Outlines content in national curriculum and/or learning standards • Shapes the content of textbooks associated with the curriculum • Aligns the curriculum with initial teacher training • Stipulates how each topic in the curriculum should be taught
2. Attracting the best into teaching			
Professional Autonomy	**Shared Responsibility**	**Career Development**	**Performance Management**
• Requires that applicants to initial teacher training programs meet multiple admissions criteria	• Requires that applicants to initial teacher training programs meet multiple admissions criteria • Ensures that teacher pay remains competitive relative to that in other professions	• Requires that applicants to initial teacher training programs meet multiple admissions criteria • Ensures that teacher pay remains competitive relative to that in other professions • Offers multiple opportunities for promotions for teachers	• Requires that applicants to initial teacher training programs meet multiple admissions criteria • Ensures that teacher pay remains competitive relative to that in other professions • Offers multiple opportunities for promotions for teachers • Links pay increases and promotion opportunities to teacher performance
3. Preparing teachers with useful training and experience			
Professional Autonomy	**Shared Responsibility**	**Career Development**	**Performance Management**

• Provides rigorous initial teacher training with strong focus on subject matter knowledge and pedagogy • Incorporates a clinical component into initial teacher training	• Provides rigorous initial teacher training with strong focus on subject matter knowledge and pedagogy • Incorporates a clinical component into initial teacher training	• Provides rigorous initial teacher training with strong focus on subject matter knowledge and pedagogy • Incorporates a clinical component into initial teacher training • Requires all new teachers to complete an induction program	• Provides rigorous initial teacher training with strong focus on subject matter knowledge and pedagogy • Incorporates a clinical component into initial teacher training • Requires all new teachers to complete an induction program • Monitors teacher performance closely in their first years of practice
4. Matching teachers' skills with students' needs			
Professional Autonomy	**Shared Responsibility**	**Career Development**	**Performance Management**
--	• Reassigns teachers and principals in order to ensure equitable levels of instruction	• Reassigns teachers and principals in order to ensure equitable levels of instruction	• Reassigns teachers and principals in order to ensure equitable levels of instruction • Adjusts slots in initial teacher training according to demand for particular teaching posts
5. Leading teachers with strong principals			
Professional Autonomy	**Shared Responsibility**	**Career Development**	**Performance Management**
--	• Offers professional development for principals to improve	• Offers professional development for principals to improve • Requires that teachers who aspire to school leadership positions meet multiple criteria • Evaluates principals periodically and ties evaluations to clear consequences	• Offers professional development for principals to improve • Requires that teachers who aspire to school leadership positions meet multiple criteria • Evaluates principals periodically and ties evaluations to clear consequences • Establishes a clear career progression for school leadership positions leading to principalship
6. Monitoring teaching and learning			
Professional Autonomy	**Shared Responsibility**	**Career Development**	**Performance Management**

• Uses classroom assessments to identify students in need of support	• Uses classroom assessments to identify students in need of support • Creates opportunities for peer-to-peer observations	• Uses classroom assessments to identify students in need of support • Creates opportunities for peer-to-peer observations • Employs formative assessments to provide valuable feedback to teachers on how to improve instruction	• Uses classroom assessments to identify students in need of support • Creates opportunities for peer-to-peer observations • Employs formative assessments to provide valuable feedback to teachers on how to improve instruction • Ties teacher evaluations to pay increases and promotion opportunities
7. Supporting teachers to improve instruction			
Professional Autonomy	**Shared Responsibility**	**Career Development**	**Performance Management**
• Requires all teachers to complete professional development	• Requires all teachers to complete professional development • Creates opportunities for teachers to learn from each other	• Requires all teachers to complete professional development • Creates opportunities for teachers to learn from each other • Invests in professional development at the school level to solve issues specific to an institution	• Requires all teachers to complete professional development • Creates opportunities for teachers to learn from each other • Invests in professional development at the school level to solve issues specific to an institution
8. Motivating teachers to perform			
Professional Autonomy	**Shared Responsibility**	**Career Development**	**Performance Management**
--	• Creates spaces for teachers to give each other feedback on their work	• Creates spaces for teachers to give each other feedback on their work	• Creates spaces for teachers to give each other feedback on their work • Establishes a probationary period for all novice teachers • Links pay increases and promotion opportunities to teacher performance

Source: *Authors' elaboration, based on reference list in Table A.1.*
Note: *-- Not applicable.*

IV. Why and How Can Education Systems Decide Which Teacher Policy Profile to Adopt?

Adopting a teacher policy profile is useful because it helps an education system articulate its theory of action to ensure all students have an effective teacher.

Most systems have an idea of how they expect to ensure they have effective teachers—whether it is through recruiting talented individuals into teaching, fostering collaboration, providing quality training, keeping a tight control on all aspects of the profession or a combination of some of these. Yet, this theory too often remains implicit. This is not ideal for at least two reasons: first, it is hard to ensure all elements of a teacher policy system are aligned with a theory if it is not made explicit; second, it is even harder to scrutinize and thus to improve upon a theory if it remains implicit. Therefore, education systems in need of improvement would be well-advised to try to articulate how they expect to have effective teachers in every classroom. The teacher policy profiles can help systems articulate this theory by providing different alternative options derived from successful systems. This does not mean that systems in need of improvement cannot achieve high performance following a combination of two or more profiles, or even a different route than those of top-performing systems. It simply offers those whose theory resonates with those of top systems a clearer roadmap towards improvement.

SABER-Teachers developed a compatibility assessment to determine which teacher policy profile is the best match for a system in need of improvement. SABER-Teachers has designed a tool to figure out which teacher policy profile would be the best fit for an education system in need of improvement. This compatibility assessment seeks to understand whether quality assurance in teaching should be done primarily by the government, by teachers or by a combination of both the government and teachers. The compatibility assessment is not designed to choose a particular teacher policy profile for an education system. Rather, it seeks to help system leaders understand what the system does best so that they may decide which teacher policy profile they may want to adopt to chart their improvement journey. To be sure, there are a number of considerations in choosing a teacher policy profile that are not factored into the comparability assessment (e.g., the role of culture). Yet, the assessment is only meant to provide an empirical basis for structural changes in teacher policy systems.

The compatibility assessment covers five areas: system scope, system governance, system capacity, teacher professionalization and incentive structure. The first three of these areas (system scope, system governance and system capacity) assess the potential of the government to be involved in the quality assurance of teaching; the fourth one (teacher professionalization) assesses the potential of teachers to partake in this task; and the fifth one (incentive structure) assesses the potential for collaboration between government and teachers on this front.

a. System scope: This area seeks to understand how easy it is for the education system to adopt policies that will influence all schools under its control. The larger the system, the harder it is for the government to adopt policies that will influence and thus the harder it will be to more involved in the quality assurance of teaching.

b. System governance: This area asks about the distribution of decision-making authority across the system—from the national level to the schools. The more involved the government already is in making key decisions that affect teaching, the better placed it will be to be to more involved in the quality assurance of teaching.

c. System capacity: This area inquires into the extent to which the education system has been effective at ensuring that the policies it adopts are implemented. The wider the gap between policies and implementation, the less well-equipped a government seems to be to be more involved in the quality assurance of teaching.

d. Teacher Professionalization: This area looks into the levels of education and performance of teachers currently employed by the system. The more capable are teachers in the workforce already, the more active they can be in the quality assurance of the profession.

e. Incentive Structure: This are explores the extent to which the government has mechanisms in place to influence teachers' behavior. The more mechanisms it has in place, the better prepared it is to collaborate with teachers in ensuring that the profession maintains the best standards of quality.

Each of the five areas of the compatibility assessment is divided into subareas and each subarea is measured by indicators drawing on SABER-Teachers data. Much like the SABER-Teachers policy goals are divided into policy levers, the five areas of the compatibility assessment are divided into subareas—groups of indicators that measure different aspects of each area. For example, the area of system scope is divided into five subareas: (a) how many students are there in the system?; (b) how many teachers are there in the system?; (c) how large is the private school system?; (d) how much is spent per student?; and (e) what is the age distribution of the teacher workforce? Each indicator, in turn, is linked to one (or more) questions in the SABER-Teachers data collection instruments. **Table A.2** in Appendix A includes a full list of the areas, subareas and indicators included in the compatibility assessment and the questions in the data collection instruments to which they are linked.

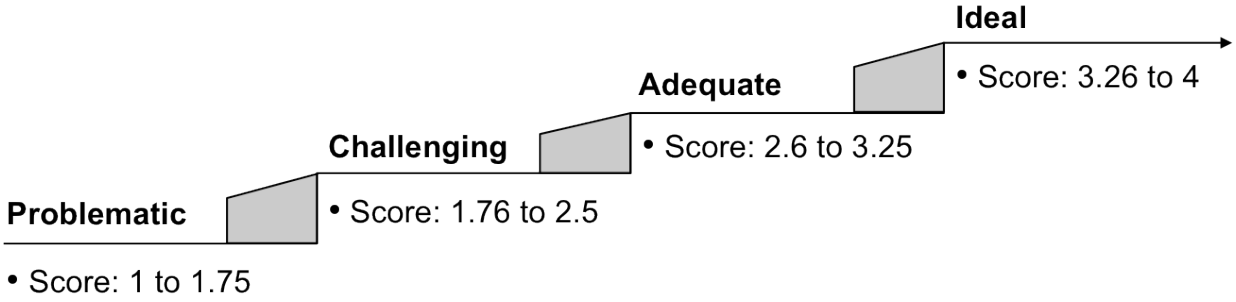
SABER-Teachers classifies each area of the compatibility assessment according to whether it makes it easier or harder for the government, teachers or both to be involved in the quality assurance of teaching. In order to classify each area, the SABER-Teachers team follows these steps:

- First, it classifies each indicator in the compatibility assessment from 1 to 4. In the case of the first three areas (system scope, system governance and system capacity), low scores mean that it will be harder for the government to take on a more active role in the quality assurance of teaching and high scores mean that it will be easier for the government to do so. In the case of the fourth area (teacher professionalization), low

scores mean that it will be harder for teachers to take on a more active role in the quality assurance of their profession and high scores mean the opposite. Finally, in the case of the fifth area (incentive structure), low scores mean that it will be harder for the government and teachers to collaborate and high scores indicate that the converse is true. Some scores were developed based on expert judgment and others with respect to benchmarks from the best education systems, outlined in Figure III.1. **Appendix B** includes all the graphs for the indicators whose scoring was aided by benchmarks.

- Then, it averages the score of the indicators within each subarea. In order to pinpoint what within each area either helps or hinders the potential involvement of an actor in the quality assurance of teaching, SABER-Teachers averages the score of the indicators within each subarea. These average scores are in turn summarized by one of four categories: problematic, challenging, adequate and ideal. For example, if the number of students in an education system far surpasses that of successful systems, in the first area (system scope), the first subarea (how many students are there in the system?) would get a 1 (problematic), to indicate that the large number of students makes it very hard for the government to ensure the quality of teaching. **Table A.3** in Appendix A shows all the possible scores and labels for each indicator. The cutoffs for the different categories are shown in **Figure IV.1** below.

Figure IV.1: Cutoff Scores for the Categories of the Compatibility Assessment



Source: Authors' elaboration.

- Finally, it averages the scores of the indicators within each area. In order to aggregate the results of all the subareas, SABER-Teachers then averages all the scores of the subareas and assigns a score and a category to each area as a whole.

V. A Sample Compatibility Assessment: The Case of Chile

The last section of this paper presents an example of a compatibility assessment. This illustration focuses on the case of Chile, which is one of the systems on which SABER-Teachers has already collected data. It is important to note that while the following paragraphs cover all five areas of the compatibility assessment, they do not strictly follow

the order of the subareas in Table A.2 or cover all indicators. The analysis was written to emphasize the most important aspects to consider when deciding what type of teacher policy profile Chile should adopt.

The fairly small size of the Chilean education system does not pose any major obstacles to more government involvement in the quality assurance of teaching. Chile has 1.36 million students and 71,878 teachers in primary and 462,783 students and 22,836 teachers in secondary (including both the public and private sectors). This is in fact the average size for top-performing education systems: Chile is larger than Singapore, Finland, Hong Kong, Hungary and Belgium, but much smaller than the Netherlands, Canada, South Korea and Japan, which have over 2 million students in total. The number of teachers is commensurate with the size of the system: there are 71,878 teachers at the primary level and 22,836 at the secondary level in Chile, which is well in line with the size of the teaching forces in the best education systems.

Typically, the size of the private sector can offer a more accurate indication of the number of schools that are actually under the direct responsibility of the government. In Chile, the private sector is quite large: 55% of students in primary and secondary attend private schools. However, 99% of private school students in primary and 70% of private school students in secondary attend publicly-funded private schools. Similarly, 97% of private school teachers in primary and 70% of private school teachers in secondary work in these publicly-funded schools. Therefore, in Chile, accounting for the size of the private system does not change our assessment of the system scope all that much. Yet, even if most private schools in Chile are publicly-funded, the size of the system remains manageable.

The more an education system invests per student, the more resources it will have to ensure that the student has an excellent teacher—even if efficiency considerations are key. Chile invests 15% of its gross domestic product (GDP) per capita per primary school student, which is in line with the investments of high-performing education systems. However, while most top performers invest more than 20% of their GDP per capita per secondary school student, Chile invests only 16% of its GDP per capita at this level, placing it at the lower end of the distribution of top-performing systems.

The age distribution of the teaching force can often give an indication of the potential that reforms have to impact the profession: in particular, the younger the make-up of the teaching force, the greater the potential for the impact of teacher policies, since research suggests that teacher effectiveness is highly variable in the first years of experience but fairly stable thereafter. In Chile, only 10% of teachers are 29 or younger. This is similar to some top-performing systems, such as Japan, Finland and Hungary, where about 10% of teachers are within this age range, and it is below others, such as the Netherlands, Belgium and South Korea, which have between 20 and 25% of teachers in this age range.

The distribution of decision-making authority across the Chilean education system makes it easy for the government to ensure the quality of teaching. The number of actors involved in making and implementing teacher policies, and the level of government at which they operate, can offer a sense of how easy or hard it will be for the government to take an active role in the quality assurance of teaching. While a particular distribution of decision-making in education might suit a system better (e.g., more or less centralized) for many reasons (e.g., efficiency or accountability), the more actors and the more levels are involved in making or implementing teacher policies, the harder it is for the government to ensure that all students have an outstanding teacher in their classrooms.

In Chile, the central government sets the minimum standards for teaching and learning. In the case of teaching, the central government sets the requirements for entry into the profession, it determines the experience that student teachers must acquire before graduating, it sets teachers' wages, as well as their health and retirement benefits, and finally, for evaluating teachers and reporting the results of those evaluations to the public. In the case of learning, the central government sets the curriculum and the learning standards, it monitors compliance with standards for school infrastructure and, among other things, it also decides on the role of principals. Regardless of the merits or pitfalls of this concentration of authority at the central level, it makes it quite easy for the government to shape teacher policies.

Personnel decisions, however, are made at the local level in Chile. It is the local governments who allocate teachers, hire them, promote them (and principals) and fire them if necessary, regardless of whether they are on open-ended or fixed-term contracts. This decentralization of personnel policies might be desirable for many reasons. Yet, it could also potentially present challenges of coordination between the central standards and the implementation in the front lines.

Finally, many decisions about teaching and learning need to be negotiated with teacher organizations. Collective bargaining in Chile takes place at the national level and teacher organizations are consulted on almost every meaningful teacher policy. While this may be desirable (both for teachers and for the system as a whole), it necessarily limits the room for government action in the quality assurance of teaching.

The Chilean government frequently implements teacher policies as stipulated. Minimum standards for teaching and learning appear to be consistently enforced. In the case of teaching, those responsible for setting entry requirements actually do so, those responsible for setting standards for teachers do so and, according to official data, all teachers in primary and secondary meet entry requirements. In the case of learning, those responsible for setting learning standards, those responsible for regulating the role of school principals and those responsible for monitoring compliance with standards for school infrastructure actually do so, although data are missing on the number of schools

that comply with these standards. These data could be quite helpful in assessing the government's true capacity to enforce these standards uniformly throughout the country.

The government is also enforcing regulations about teacher accountability, such as assigning identification numbers to students and teachers to ensure their performance can be tracked appropriately across time and, more importantly, evaluating teacher performance. There only seem to be two implementation gaps: one in the area of professional development, where more actors seem to be financing professional development than what would be stipulated by law, and another one in the area of standards for teacher performance, where responsibility for setting these standards is not implemented as stipulated by law. These gaps notwithstanding, the Chilean government seems quite effective at ensuring laws and regulations concerning teachers are followed.

Chilean teachers seem to have the skills they need to be more active in quality assurance, but they are likely to need scaffolding if they are to take on new roles. Exploring the skills and current roles of teachers can throw light on whether they are prepared to take on a more active role in the quality assurance of the profession. In Chile, all teachers attain a tertiary academic (ISCED 5A) degree, whether they are trained through a consecutive or a concurrent model (there are no alternative models). However, there is reason to believe standards to enter the profession are not particularly high: 85% of those who apply to initial teacher training programs are admitted—compared to 10% in Finland and 12% in Singapore. Only less than 1% of Chilean teachers failed their last round of evaluations, but this could be because the process may not be too demanding.

Yet, Chilean teachers do not currently have much autonomy over their work. They have full autonomy on the choice of their teaching methods, but they have limited autonomy on virtually all other aspects of their work, including: the compulsory and optional elements of the curriculum, the choice of textbooks and the criteria for internal assessments of students. Regardless of whether this level of autonomy is appropriate for other purposes, this suggests that any change in teachers' roles in the quality assurance of the profession would need to be accompanied by sufficient capacity-building, since they have not yet taken on these higher-autonomy at school.

The government has few incentives in place to influence teachers' behavior. The number and type of teacher incentives can throw light on the extent to which the government is well-equipped to collaborate with teachers in ensuring the quality of the profession: the more incentives that are already in place, the better prepared the government is to leave some tasks of quality assurance to teachers and let incentives lead them to make the right decisions.

In Chile, there are multiple incentives to motivate low-performing teachers to improve and for high-performing teachers to keep up their good work. In the case of low performers, teacher pay is reduced for unauthorized absences and teachers who are identified as low-

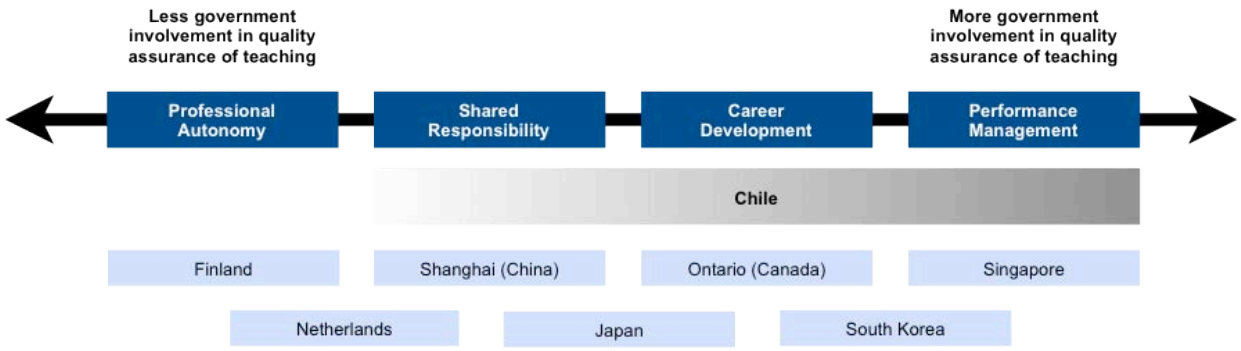
performing are assigned to professional development and/or supervisors and can be removed from the classroom or even dismissed. By contrast, those identified as high-performing teachers can have access to more professional development, public recognition, better chances of promotion and monetary bonuses.

There are also incentives to influence teachers' career decisions, although more could be done in this domain. In Chile, teachers can receive a monetary bonus for working in hard-to-staff schools, teaching difficult student populations, raising student learning taking on teacher-leader roles, obtaining additional qualifications, undertaking additional professional development and raising the school's performance. Interestingly, however, Chilean teachers receive no incentives for teaching critical shortage subject areas or working with difficult student populations and there is no data on whether they receive incentives to teach in mother tongue languages.

Yet, employment terms and collective bargaining provisions leave little flexibility in teachers' employment regulations. There is no compulsory probationary period for teachers, and virtually all of them are hired under open-ended or fixed-term contracts, which makes it quite hard to dismiss teachers for poor performance. Further, more than 70% of teachers at the primary and secondary level are unionized (comparable data for principals are missing) and the results of collective bargaining affect all teachers, which suggests that the government has little room for maneuver when it comes to making considerable changes to the profession—at least, without securing consensus from teachers' unions.

In light of the favorable system scope, governance and capacity, and of the challenges in teacher professionalization and incentive structure, Chile seems best placed to adopt a teacher policy profile that is more government-intensive. The adequate scope, governance and capacity of the system suggest the government could be more involved in the quality assurance of the teaching profession. The adequate level of teacher professionalization suggests that some quality control responsibilities could be shared with teachers. Yet, the government would have to adopt new and better incentives if it is to engage teachers as partners in quality assurance. Chile thus seems optimally placed to adopt a teacher policy profile that entails more government involvement in the quality assurance of teaching—especially, career development or performance management, as **Figure V.1** indicates.

Figure V.1: Potential Teacher Policy Profiles for Chile



Source: Authors' elaboration.

APPENDIX A

Table A.1: Review of Existing International "Benchmarking" Efforts

Databases				
Citation	**Criteria**	**Systems**	**Methodology**	**Teacher Policies**
Eurydice (1999-2009). *Key Data on Education in Europe*. Brussels, Belgium: Education, Audiovisual and Cultural Executive Agency (EACEA).	Member countries of the EU	Austria, Belgium, Bulgaria, Cyprus, Czech Rep., Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Rep., Slovenia, Spain, Sweden and the UK	Data from Eurydice network, Eurostat, PISA and PIRLS	1. Concurrent model of teacher training is the preferred pathway 2. Teacher education is professionally-oriented for pre-primary teachers, occupationally-oriented for primary teachers and academically-oriented for secondary teachers 3. Clinical teacher of teacher training exists in few countries 4. Support for teachers is increasing 5. Professional development is mandatory 6. Most teachers spend less than 35 hours on training for teaching reading 7. Teachers are career civil servants in only a few EU countries 8. Support for teachers is increasingly regulated 9. Special support for reading difficulties is offered outside of the classroom 10.Teacher contracts factor in non-teaching time 11.Number of required teaching hours varies widely across countries 12.Official retirement age for teachers is generally 65 13.Seniority is the main factor influencing teacher salaries.
Case Studies				
Citation	**Criteria**	**Systems**	**Methodology**	**Teacher Policies**
Auguste, B., Kihn, P. & Miller, M. (2010). "Closing the Talent Gap: Attracting and Retaining Top-Third Graduates to Careers into Teaching." London, UK: McKinsey & Co.'s Social Sector Office.	High performance in international tests	Finland, Korea and Singapore	Review of analyses and interviews with policy-makers	1. Selective admissions to teacher training are selective 2. Government-funded teacher training 3. Government regulation of teacher supply to match demand 4. Professional working environment 5. Competitive compensation 6. High prestige of the profession 7. Opportunities for career advancement 8. Performance pay

Darling-Hammond, L. (2010). "Steady Work: How Countries Build Successful Systems" and "Doing What Matters Most: Developing Competent Teaching." In *The Flat World and Education: How America's Commitment to Equity Will Determine Our Future*. New York, NY: Teachers College Press.	High performance in international tests	Finland, Korea and Singapore (including comparisons with OECD countries)	Review of analyses and interviews with policy-makers	Finland: 1. Extension of teacher training 2. Selection into teacher training 3. Clinical experience component of teacher training 4. Time and space allotted for collaboration for teachers at school 5. Teachers' capacity to create challenging curricula 6. Teachers' dual master's degrees in their subject matter and in education.
				Korea: 1. Compulsory training and exams to enter the profession 2. High respect attributed to the profession 3. Automatic tenure upon hiring 4. Highly desirable working conditions 5. Induction programs for beginning teachers 6. Personal learning opportunities for teachers 7. Career opportunities and salary incentives
				Singapore: 1. Link between curriculum and teachers' pre- and in-service training 2. Active recruitment for and government coverage of training costs 3. Reform in teacher training to augment teachers' pedagogical knowledge and expand practicum training in exemplary schools 4. Close collaboration between expert and novice teachers 5. Government-subsidized professional development 6. Opportunities for collaboration among teachers 7. Principal training at the government's expense with school apprenticeships
Darling-Hammond, L. & Rothman, R. (Eds.) (2011). *Teacher and Leader Effectiveness in High-Performing Education Systems.* Washington, DC: Alliance for Excellent Education & Stanford, CA: Stanford Center for Opportunity Policy in Education (CREDO).	High performance in international tests	Finland, Ontario (Canada) and Singapore	Review of analyses and interviews with policy-makers	1. Systemic approach to teacher effectiveness 2. Strong recruitment and preparation 3. Attractive teaching conditions 4. Continuous support to improve learning 5. Proactive leadership development policies in place.

Goldhaber, D. (2009). "Lessons from Abroad: Exploring Cross-Country Differences in Teacher Development Systems and What They Mean for U.S. Policy." In D. Goldhaber & J. Hannaway (Eds.) Creating a New Teaching Profession. Washington, DC: The Urban Institute.	Participation in assessment of math teachers	Bulgaria, Germany, Korea, Mexico, Taiwan and the United States	Review of analyses and descriptive statistics	1. High status of the profession 2. Multiple pathways into the profession 3. Experimentation with incentives
	Industrialized countries with contrasting learning outcomes	Germany and Korea		

Cross-National Comparisons

Citation	Criteria	Systems	Methodology	Teacher Policies
Asia Society (2011). *Improving Teacher Quality around the World. The International Summit of the Teaching Profession*. Asia Society: New York, NY.	Top-performing and rapidly-improving countries in 2009 PISA	Belgium, Brazil, Canada, China, Denmark, Estonia, Finland, Hong Kong (China), Japan, the Netherlands, Norway, Poland, Singapore, Slovenia, the United Kingdom and the United States	Presentations by policy-makers, union leaders, teachers and education experts	1. Raising the quality of initial teacher training 2. Attracting high-quality and motivated teachers—especially, from underrepresented backgrounds 3. Creating a more robust evidence base for teaching and learning 4. Providing comprehensive but cost-effective professional development 5. Redesigning training for school principals and school boards 6. Creating teacher appraisal systems that promote improvement 7. Engaging key stakeholders in the policy-making process
Barber, M. & Mourshed, M. (2007). "How the World's Top-Performing School Systems Come Out on Top." London, UK: McKinsey & Co.'s Social Sector Office.	Top 10 in 2003 PISA	Alberta (Canada), Australia, Belgium, Finland, Hong Kong, Japan, Netherlands, New Zealand, Ontario (Canada), Singapore, South Korea.	Interviews with policy-makers	1. Attracting top candidates into teaching 2. Developing these people into effective instructors 3. Tackling student failure quickly by assigning struggling students to outstanding teachers

	Improvement in NAEP or TIMSS	Atlanta (US), Boston (US), Chicago (US), England (UK), Jordan, New York (US) and Ohio (US).		
	Launching major reforms	Bahrain, Brazil, Qatar, Saudi Arabia and UAE.		
Barber, M. & Mourshed, M. (2009). "Shaping the Future: How Good Education Systems Can Become Great in the Decade Ahead." Report on the International Education Roundtable. 7 July 2009, Singapore.	Not specified	Alberta (Canada), Hong Kong (China), China, Sweden, the United States and Victoria (Australia)	Expert opinion	1. Recruiting top talent into teaching 2. Supporting and managing teachers and leaders to be successful and to retain them 3. Establishing a model of teaching practice and embed it in instruction and professional development 4. Offering leadership development to school leaders.
Carnoy, M., Brodziak, I., Luschei, T., Bateille, T. & Loyalka, P. (2009). *Do Countries Paying Teachers Higher Relative Salaries Have Higher Student Mathematics Achievement?* Amsterdam, the Netherlands: International Association for the Evaluation of Educational Achievement (IEA).	Volunteer participation and additional convenience sampling	Australia, Botswana, Bulgaria, Canada, Chile, Finland, France, Georgia, Germany, Hong Kong (China), Italy, Korea, Malaysia, Mexico, Norway, Oman, Philippines, Poland, Russian Federation, Singapore, Spain, Switzerland, Taipei (China), Thailand, the United Kingdom and the United States	Multivariate regression analysis with TEDS-M results	1. Successful systems are clustered in the high-paying group: Chile, Finland, Hong Kong, Korea, Singapore, Taipei (China) and the United Kingdom

Center for Research in Mathematics and Science Education. (2010). *Breaking the Cycle: An International Comparison of U.S. Mathematics Teacher Preparation*. East Lansing, MI: Michigan State University.	Volunteer participation	Norway, Philippines, Poland, Russian Federation, Singapore, Spain, Switzerland, Taipei (China), Thailand and the United States	Surveys and assessments of future teachers	1. Middle-school math teacher preparation in the US is weak, but that for elementary teachers is slightly better 2. In top-achieving systems, middle school preparation programs allocated half of their course taking to preparation on formal math and half either to math or general pedagogy 3. Top education systems had 90% of their future teachers taking a two-course sequence in calculus and a course in linear algebra 4. Teachers entering initial teacher training in the best systems have already been exposed to a rigorous math curriculum
Mourshed, M., Chijioke, C. & Barber, M. (2010). "How the World's Most Improved School Systems Keep Getting Better." London, UK: McKinsey & Co.'s Social Sector Office.	Sustained, significant or widespread gain on universal scale of international student assessments from 1964 to 2010	Sustained improvers: Aspire Public Schools (US), Boston, MA (US), England (UK), Hong Kong, Korea, Latvia, Lithuania, Long Beach, CA (US), Ontario (Canada), Poland, Saxony (Germany), Singapore and Slovenia. Promising starts: Armenia, Chile, Ghana, Jordan, Madhya Pradesh (India), Minas Gerais (Brazil) and Western Cape (South Africa).	Database of historical interventions collected through document analysis and interviews with policy makers	"Stage dependent" interventions: 1. Providing scaffolding for low-skilled teachers (poor to fair) 2. Ensuring teacher and school accountability (fair to good) 3. Ensuring teaching and leadership are regarded as full-fledged professions (good to great) 4. Putting in place the necessary practices and career paths to ensure the profession is clearly defined (good to great) "Cross-stage" interventions: 1. Ensuring an appropriate remuneration level for teachers and principals

OECD (2009). *Evaluating and Rewarding the Quality of Teachers. International Practices.* Paris, France: Organisation for Economic Co-operation and Development (OECD).	Education systems that have innovations on the issues of teacher pay	Argentina, Australia, Belgium, Bolivia, Brazil, Canada, Chile, China, Colombia, Denmark, El Salvador, Estonia, Finland, France, Germany, Honduras, Iceland, India, Ireland, Israel, Italy, Japan, Kenya, Korea, Mexico, the Netherlands, New Zealand, Nicaragua, Norway, Panama, Paraguay, Peru, Portugal, Singapore, Sweden, Switzerland, Turkey, the United Kingdom, the United States, Uruguay	Review of analyses	1. There are financial and non-financial incentives for teachers 2. Incentives are often given for teachers' knowledge and skills, for teaching in shortage subject areas, for teaching in schools with difficult environments and/or for improvements in student achievement 3. When designing an incentives program, it is important to consider: the incentive structure, the unit of accountability, the performance measures, the performance standards and thresholds, the size and distribution of bonuses, the payout frequency and cultural considerations 4. When implementing an incentives program, it is important to consider: stakeholder engagement and communication strategies, potential consequences if educators are not engaged in the formation of policies on compensation and desirable practices in communication and stakeholder engagement
OECD (2009). *Creating Effective Teaching and Learning Environments. First results from TALIS.* Paris, France: Organisation for Economic Co-operation and Development (OECD).	Volunteer participation	Australia, Austria, Belgium (Fl.), Brazil, Bulgaria, Denmark, Estonia, Hungary, Iceland, Ireland, Italy, Korea, Lithuania, Malaysia, Malta, Mexico, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain and Turkey	Survey of teachers and principals	1. Systems with more pronounced instructional leadership link teacher appraisals to professional development and schools 2. Relatively weak evaluation structures and lack of school evaluations and teacher appraisal and feedback 3. Teachers participate in professional development for one day a month

OECD (2011). *Strong Performers and Successful Reformers in Education: Lessons from PISA for the United States*. Paris, France: Organisation for Economic Co-operation and Development (OECD)	1. High school enrollment 2. 2009 PISA ranking 3. Scores of top students 4. Weak link between learning and poverty 5. Efficient spending	Canada, Shanghai (China), Hong Kong (China), Finland, Japan, Singapore, Poland, United States, United Kingdom	Review of analyses and interviews with policy-makers	1. Attracting high-quality teachers 2. Preparing high-quality teachers 3. Developing teacher quality once teachers are in the workforce 4. Fostering the professionalization of teaching 5. Developing capable school leaders 6. Providing a work organization in which teachers can use their potential
	Progress in 1-5 above	Brazil and Germany		
OECD (2011). *PISA 2009 Results: What Makes a School Successful? Resources, Policies and Practices. Vol. IV*. Paris, France: Organisation for Economic Co-operation and Development (OECD).	Performance above OECD average in reading and below OECD-average impact of poverty on student outcomes	Canada, Estonia, Finland, Iceland, Japan, Korea and Norway (and other systems close to meeting the criteria)	Multivariate regression analysis with PISA 2009 results	1. No link between school autonomy over teacher hiring, teacher firing, teachers' starting salaries or salary increases and student performance 2. Association between higher teachers' salaries (but not reducing class size) with better student performance
OECD (2011). *Building a High-Quality Teaching Profession. Lessons from Around the World*. Paris, France: Organisation for Economic Co-operation and Development (OECD).	Top-performing and rapidly-improving countries in 2009 PISA	Belgium, Brazil, Canada, China, Denmark, Estonia, Finland, Hong Kong (China), Japan, the Netherlands, Norway, Poland, Singapore, Slovenia, the United Kingdom and the United States	Review of previous analyses and data from TALIS 2011	1. Making teaching an attractive career choice 2. Ensuring high-quality teacher preparation 3. Meeting teachers' needs for professional development 4. Fostering an environment for teacher collaboration 5. Establishing effective employment conditions 6. Providing for attractive careers 7. Making teacher appraisal systems effective 8. Maximizing the impact of teacher appraisal 9. Designing effective compensation systems 10.Achieving educational reform that works 11.Securing a strategic relationship between governments and unions

Schmidt, W. et al. (2007). *The Preparation Gap: Teacher Education for Middle School Mathematics in Six Countries.* Ann Arbor, MI: MSU Center for Research in Mathematics and Science Education.	Volunteer participation	Bulgaria, Germany, Korea, Mexico, Taipei (China) and the United States	Survey of teachers	1. Taiwanese and Korean future teachers are the top performers in all five assessed areas of mathematical knowledge 2. These teachers also reported taking courses that covered a greater share of the advanced mathematical topics typically covered in undergraduate math programs
Tucker, M. S. (2011). "Standing on the Shoulders of Giants. An American Agenda for Education Reform." Washington, DC: National Center for Education and the Economy.	1.Student achievement at the top is world class (quality) 2. Lowest-performing students do not lag far behind top-performing students (equity) 3. System produces results at low cost (productivity)	Finland, Japan, Ontario (Canada), Shanghai (China), Singapore	Review of analyses and interviews with policy-makers	1. Raising standards for entry into teacher education 2. Moving teacher education into major research universities 3. Insisting that teachers of all subjects have a depth and breadth of mastery of the subjects they will teach that is comparable to those with bachelors 4. Making sure prospective teachers have excellent skills in diagnosing student problems and prescribing appropriate solutions 5. Designing teacher preparation on a clinical model 6. Raising the criteria for teacher licensure and never waiving the licensure standards in the face of shortages 7. Making sure compensation for beginning teachers is and remains comparable to those of non-feminized professions and adding the amounts necessary to get teachers to work in hardship locations 8. Providing an induction period for new teachers of at least a year 9. Constructing multiple career paths for teachers (including school administration) that are merit-based and that imply increasing responsibility and compensation 10.Identifying teachers with administration potential, grooming them for advancement and supporting them so long as they continue to show potential for advancement

Source: *Author's elaboration.*

Table A.2: List of Areas, Subareas and Indicators for the Compatibility Assessment

System Scope	
A. How many students are there in the system?	
Indicator	Data Label
1. How many students attend school at the primary level?	S12: 5a (primary), 5b (primary)
2. How many students attend school at the secondary level?	S12: 5a (secondary), 5b (secondary)
B. How many teachers are there in the system?	
Indicator	Data Label
1. How many teachers work in public schools at the primary level?	S12: 3a (primary), 3b (primary)
2. How many teachers work in public schools at the secondary level?	S12: 3a (secondary), 3b (secondary)
C. How large is the private school system?	
Indicator	Data Label
1. What share of students attend private schools at the primary level?	S12: 5a (primary), 5b (primary)
2. What share of students attend private schools at the secondary level?	S12: 1a (secondary), 1b (secondary)
3. What share of students attend government-dependent private schools at the primary level?	S12: 1a (primary), 1b (primary), 1bii. (primary)
4. What share of students attend government-dependent private schools at the secondary level?	S12: 1a (secondary), 1b (secondary), 1.b.ii. (secondary)
5. What share of private school teachers work in government-funded schools at the primary level?	S12: 3b (primary), 3.b.i (primary)
6. What share of private school teachers work in government-funded schools at the secondary level?	S12: 3b (secondary), 3.b.i (secondary)
D. How much is spent per student?	
Indicator	Data Label

1. How much is spent per pupil at the primary level (as % of GDP per capita)?	S12: 9b, 10g
2. How much is spent per pupil at the secondary level (as % of GDP per capita)?	S12: 10b, 10h
E. What is the age distribution of the teaching workforce?	
Indicator	Data Label
1. What share of public school teachers are 29 years or younger at the primary level?	S12: 19b (29 years and younger), 19b (total)
2. What share of public school teachers are 29 years or younger at the secondary level?	S12: 19c (29 years and younger), 19c (total)
3. What share of public school teachers are 65 years or older at the primary level?	S12: 19b (65 years and older), 19b (total)
4. What share of public school teachers are 65 years or older at the secondary level?	S12: 19c (65 years and older), 19c (total)
System Governance	
A. What level of government sets minimum standards for schools?	
Indicator	Data Label
1. At what level of government is the curriculum established?	S1: 10
2. At what level of government are standards established?	S1: 12
3. At what level of government are standards for school maintenance monitored?	S5: 1
4. At what level of government is the role of principals regulated?	S11: 1
B. What level of government sets minimum standards for teaching?	
Indicator	Data Label
1. At what level of government are entry requirements for teachers established?	S2: 1
2. At what level of government are practical requirements to enter teaching established?	S3: 1
3. At what level of government are regulations for initial teacher training established?	S3: 2
4. At what level are performance goals for teachers established?	S9: 2

C. What level of government regulates teacher hiring and allocation?	
Indicator	Data Label
1. At what level of government are open-ended teachers hired?	S4: 1a
2. At what level of government are contract teachers hired?	S4: 1b
3. At what level of government is funding for hiring teachers provided?	S4: 2
4. At what level of government are open-ended teachers allocated?	S4: 27a
5. At what level of government are contract teachers allocated?	S4: 27b
6. At what level of government are principals hired?	S11: 5
D. What level of government regulates teacher pay?	
Indicator	Data Label
1. At what level are teachers' wages set?	S7: 1
2. At what level are teachers' benefits set?	S7: 2
3. At what level are teachers' retirement benefits set?	S8: 1
E. What level of government regulates teachers' work at school?	
Indicator	Data Label
1. At what level of government is teachers' statutory time determined?	S5: 4
2. At what level of government are teachers' tasks determined?	S5: 5
3. At what level is professional development provided?	S6: 1
4. At what level are funds for professional development provided?	S6: 3
F. What level of government regulates teacher accountability?	
Indicator	Data Label

1. At what level are teachers evaluated?	S9: 5
2. At what level are results of teacher evaluations reported to the public?	S9: 7
3. At what level of government are open-ended teachers promoted?	S4: 26a
4. At what level of government are contract teachers promoted?	S4: 26b
5. At what level of government are open-ended teachers dismissed?	S4: 4a
6. At what level of government are contract teachers dismissed?	S4: 4b
7. At what level of government are principals evaluated?	S11: 7
G. How much influence do teacher organizations have on teacher policies?	
Indicator	Data Label
1. At what level of government is the employment relationship with teachers regulated?	S10: 1
2. At what level of government does collective bargaining take place?	S10: 7
3. For how many policy changes do teacher organizations need to be consulted?	S10: 12
System Capacity	
A. Are minimum standards for schools enforced?	
Indicator	Data Label
1. Do those responsible for setting standards actually do so?	S1: 12-13
2. Do those responsible for monitoring standards for school maintenance actually do so?	S5: 1-2
3. What share of schools complies with maintenance regulations?	S12: 1a (total), 23a (total)
4. Do those responsible for regulating the role of principals actually do so?	S11: 1-2
B. Are minimum standards for teachers enforced?	
Indicator	Data Label

1. Do those responsible for setting entry requirements for teaching actually do so?	S2: 1-2
2. Are performance standards for teachers established as stipulated?	S9: 1, 3
3. What share of primary school teachers meet entry requirements?	S12: 11a
4. What share of secondary school teachers meet entry requirements?	S12: 11b
C. Are regulations about teacher accountability enforced?	
Indicator	Data Label
1. Are identification numbers for teachers assigned as stipulated?	S1: 19-20
2. Are identification numbers for students assigned as stipulated?	S1: 21-22
3. Do those responsible for evaluating teachers actually do so?	S9: 5, 9
D. Are other regulations about teacher's work enforced?	
Indicator	Data Label
1. Do those responsible for providing funds to hire teachers actually do so?	S4: 2-3
2. Do those responsible for providing professional development actually do so?	S6: 1-2
3. Do those responsible for funding professional development actually do so?	S6: 3-4
4. Are critical shortage subjects identified as stipulated?	S4: 18-19
Teacher Professionalization	
A. How high are the standards for the teaching profession?	
Indicator	Data Label
1. What is the education level required for primary school teachers trained under a concurrent model?	S3: 7a
2. What is the education level required for primary school teachers trained under a consecutive model?	S3: 7b
3. What is the education level required for primary school teachers trained under a alternative model?	S3: 7c

4. What is the education level required for secondary school teachers trained under a concurrent model?	S3: 8a
5. What is the education level required for secondary school teachers trained under a consecutive model?	S3: 8b
6. What is the education level required for secondary school teachers trained under a alternative model?	S3: 8c
7. How many applicants are there per position in initial teacher training programs?	S12: 12-13
8. How many applicants are there per teaching position?	S12: 14-15
B. How much autonomy do teachers have?	
Indicator	Data Label
1. What level of autonomy do teachers have over the compulsory content of the curriculum?	S5: 16a
2. What level of autonomy do teachers have over the optional content of the curriculum?	S5: 16b
3. What level of autonomy do teachers have over the choice of teaching methods?	S5: 16c
4. What level of autonomy do teachers have over the choice of textbooks?	S5: 16d
5. What level of autonomy do teachers have over the criteria of internal assessments for students?	S5: 16e
6. What level of autonomy do teachers have over whether a student should repeat a grade?	S5: 16f
C. How well do teachers perform on their job?	
Indicator	Data Label
1. What share of teachers were dismissed in the last year with available data?	S12: 21
2. What share of teachers failed their evaluations in the last year with available data?	S12: 3a (total), 41
Incentive Structure	
A. Are there incentives to influence teachers' career decisions?	
Indicator	**Data Label**
1. Are there incentives for teachers to teach in mother tongue languages?	S4: 11

2. How many incentives are there for teachers to teach in mother tongue languages?	S4: 12
3. Are there incentives for teachers to work in hard-to-staff schools?	S4: 16; S7: 9b
4. How many incentives are there for teachers to work in hard-to-staff schools?	S4: 17
5. Are there incentives for teachers to teach critical shortage subjects?	S4: 21
6. How many incentives are there for teachers to teach critical shortage subjects?	S4: 22; S7: 9f
7. Are there incentives for teachers to take on lead-teacher roles?	S4: 25
8. Are there incentives for teachers to teach difficult student populations?	S7: 9e
9. Are there incentives for teachers to teach at particular grades/levels?	S7: 9g
10. Are there incentives for teachers to obtain additional qualifications?	S7: 9h
11. Are there scholarships for teachers to undertake further study and/or professional development?	S7: 9i
B. Are there incentives to influence teachers' performance?	
Indicator	**Data Label**
1. Are there incentives for teachers to perform well on their job?	S7: 9b; S9: 16c, 22c
2. Are there incentives for schools to perform well?	S7: 9d
3. Are low-performing teachers assigned to professional development?	S9: 15a, 22a
4. Are low-performing teachers assigned to a supervisor?	S9: 15b, 22b
5. Are low-performing teachers removed from the classroom?	S9: 15c, 22c
6. Are low-performing teachers dismissed?	S9: 15d, 21d, 22d
7. Are there pay cuts for low-performing teachers?	S9: 15e, 21e, 22e
8. Do high-performing teachers have access to more professional development?	S9: 16a, 21a, 22a
9. Do high-performing teachers receive more public recognition?	S9: 16b, 23b

10. Do high-performing teachers have better chances of promotion?	S9: 16d, 21c, 22d
11. Do principals receive monetary incentives based on performance?	S11: 6
C. Are there incentives to influence teachers' effort?	
Indicator	**Data Label**
1. Is teacher pay reduced for unauthorized absences from school?	S7: 10
2. Are there penalties for teachers who strike without having the legal right to do so?	S10: 6
D. How flexible are employment regulations for teachers?	
Indicator	**Data Label**
1. Is there a compulsory probationary period before teachers obtain civil servant status?	S4: 6
2. What teachers are affected by the results of collective bargaining agreements?	S10: 8
3. What share of public school teachers are open-ended at the primary level?	S12: 3a (total), 17a (open-ended)
4. What share of public school teachers are fixed-term at the primary level?	S12: 3a (total), 17a (fixed-term)
5. What share of public school teachers are on a contract at the primary level?	S12: 3a (total), 17a (contract teachers)
6. What share of public school teachers are unionized?	S12: 3a (total), 3b (total), 44
7. What share of public school principals are unionized?	S12: 54

Source: *Authors' elaboration.*
Note: *The codes on the right column refer to the questionnaires and questions in the SABER-Teachers data collection instrument. For example, "S1: 6" means that the data for an indicator is pulled from questionnaire #1, question #6.*

Table A.3: Scores and Labels for Indicators in the Compatibility Assessment

System Scope					
A. How many students are there in the system?					
Indicator	Problematic (1)	Challenging (2)	Adequate (3)	Ideal (4)	Justification
1. How many students attend school at the primary level?	8m students or more	Between 4m and 8m students	Between 1m and 3m students	Less than 1m students	• Expert judgment • Policies of successful education systems
2. How many students attend school at the secondary level?	8m students or more	Between 4m and 8m students	Between 1m and 3m students	Less than 1m students	• Expert judgment • Policies of successful education systems
B. How many teachers are there in the system?					
Indicator	Problematic (1)	Challenging (2)	Adequate (3)	Ideal (4)	Justification
1. How many teachers work in public schools at the primary level?	400,000 teachers or more	Between 160,000 and 399,999 teachers	Between 40,000 and 159,999 teachers	Less than 40,000 teachers	• Expert judgment • Policies of successful education systems
2. How many teachers work in public schools at the secondary level?	400,000 teachers or more	Between 160,000 and 399,999 teachers	Between 40,000 and 159,999 teachers	Less than 40,000 teachers	• Expert judgment • Policies of successful education systems
C. How large is the private school system?					
Indicator	Problematic (1)	Challenging (2)	Adequate (3)	Ideal (4)	Justification
1. What share of students attend private schools at the primary level?	Less than 10% of students	Between 10% and 19% of students	Between 20% and 49% of students	More than 50% of students	• Expert judgment • Policies of successful education systems
2. What share of students attend private schools at the secondary level?	Less than 10% of students	Between 10% and 19% of students	Between 20% and 49% of students	More than 50% of students	• Expert judgment • Policies of successful education systems

3. What share of students attend government-dependent private schools at the primary level?	More than 50% of students	Between 20% and 49% of students	Between 10% and 19% of students	Less than 10% of students	• Expert judgment • Policies of successful education systems
4. What share of students attend government-dependent private schools at the secondary level?	More than 50% of students	Between 20% and 49% of students	Between 10% and 19% of students	Less than 10% of students	• Expert judgment • Policies of successful education systems
5. What share of private school teachers work in government-funded schools at the primary level?	More than 75% of teachers	Between 50% and 74% of teachers	Between 25% and 49% of teachers	Less than 25% of teachers	• Expert judgment
6. What share of private school teachers work in government-funded schools at the secondary level?	More than 75% of teachers	Between 50% and 74% of teachers	Between 25% and 49% of teachers	Less than 25% of teachers	• Expert judgment
D. How much is spent per student?					
Indicator	Problematic (1)	Challenging (2)	Adequate (3)	Ideal (4)	Justification
1. How much is spent per pupil at the primary level (as % of GDP per capita)?	Less than 10% of GDP per capita	Between 10% and 14% of GDP per capita	Between 15% and 19% of GDP per capita	20% of GDP per capita or more	• Expert judgment • Policies of successful education systems
2. How much is spent per pupil at the secondary level (as % of GDP per capita)?	Less than 15% of GDP per capita	Between 15% and 19% of GDP per capita	30% of GDP per capita or more	30% of GDP per capita or more	• Expert judgment • Policies of successful education systems
E. What is the age distribution of the teaching workforce?					
Indicator	Problematic (1)	Challenging (2)	Adequate (3)	Ideal (4)	Justification
1. What share of public school teachers are 29 years or younger at the primary level?	Less than 10% of teachers	Between 10% and 14% of teachers	More than 20% of teachers	More than 20% of teachers	• Expert judgment • Policies of successful education systems

2. What share of public school teachers are 29 years or younger at the secondary level?	3% or more of teachers	Between 2% and 2.9% of teachers	Between 1% and 1.9% of teachers	Less than 1% of teachers	• Expert judgment • Policies of successful education systems
3. What share of public school teachers are 65 years or older at the primary level?	Less than 10% of teachers	Between 10% and 14% of teachers	More than 20% of teachers	More than 20% of teachers	• Expert judgment • Policies of successful education systems
4. What share of public school teachers are 65 years or older at the secondary level?	3% or more of teachers	Between 2% and 2.9% of teachers	Between 1% and 1.9% of teachers	Less than 1% of teachers	• Expert judgment • Policies of successful education systems
System Governance					
A. What level of government sets minimum standards for schools?					
Indicator	Problematic (1)	Challenging (2)	Adequate (3)	Ideal (4)	Justification
1. At what level of government is the curriculum established?	School OR Multiple levels	Local	Sub-National	National	• Expert judgment
2. At what level of government are standards established?	School OR Multiple levels	Local	Sub-National	National	• Expert judgment
3. At what level of government are standards for school maintenance monitored?	School OR Multiple levels	Local	Sub-National	National	• Expert judgment
4. At what level of government is the role of principals regulated?	School OR Multiple levels	Local	Sub-National	National	• Expert judgment
B. What level of government sets minimum standards for teaching?					
Indicator	Problematic (1)	Challenging (2)	Adequate (3)	Ideal (4)	Justification

1. At what level of government are entry requirements for teachers established?	School OR Multiple levels	Local	Sub-National	National	• Expert judgment
2. At what level of government are practical requirements to enter teaching established?	School OR Multiple levels	Local	Sub-National	National	• Expert judgment
3. At what level of government are regulations for initial teacher training established?	School OR Multiple levels	Local	Sub-National	National	• Expert judgment
4. At what level are performance goals for teachers established?	School OR Multiple levels	Local	Sub-National	National	• Expert judgment
C. What level of government regulates teacher hiring and allocation?					
Indicator	Problematic (1)	Challenging (2)	Adequate (3)	Ideal (4)	Justification
1. At what level of government are open-ended teachers hired?	School OR Multiple levels	Local	Sub-National	National	• Expert judgment
2. At what level of government are contract teachers hired?	School OR Multiple levels	Local	Sub-National	National	• Expert judgment
3. At what level of government is funding for hiring teachers provided?	School OR Multiple levels	Local	Sub-National	National	• Expert judgment
4. At what level of government are open-ended teachers allocated?	School OR Multiple levels	Local	Sub-National	National	• Expert judgment
5. At what level of government are contract teachers allocated?	School OR Multiple levels	Local	Sub-National	National	• Expert judgment

6. At what level of government are principals hired?	School OR Multiple levels	Local	Sub-National	National	• Expert judgment
D. What level of government regulates teacher pay?					
Indicator	Problematic (1)	Challenging (2)	Adequate (3)	Ideal (4)	Justification
1. At what level are teachers' wages set?	School OR Multiple levels	Local	Sub-National	National	• Expert judgment
2. At what level are teachers' benefits set?	School OR Multiple levels	Local	Sub-National	National	• Expert judgment
3. At what level are teachers' retirement benefits set?	School OR Multiple levels	Local	Sub-National	National	• Expert judgment
E. What level of government regulates teachers' work at school?					
Indicator	Problematic (1)	Challenging (2)	Adequate (3)	Ideal (4)	Justification
1. At what level of government is teachers' statutory time determined?	School OR Multiple levels	Local	Sub-National	National	• Expert judgment
2. At what level of government are teachers' tasks determined?	School OR Multiple levels	Local	Sub-National	National	• Expert judgment
3. At what level is professional development provided?	School OR Multiple levels	Local	Sub-National	National	• Expert judgment
4. At what level are funds for professional development provided?	School OR Multiple levels	Local	Sub-National	National	• Expert judgment
F. What level of government regulates teacher accountability?					
Indicator	Problematic (1)	Challenging (2)	Adequate (3)	Ideal (4)	Justification
1. At what level are teachers evaluated?	School OR Multiple levels	Local	Sub-National	National	• Expert judgment

2. At what level are results of teacher evaluations reported to the public?	School OR Multiple levels	Local	Sub-National	National	• Expert judgment
3. At what level of government are open-ended teachers promoted?	School OR Multiple levels	Local	Sub-National	National	• Expert judgment
4. At what level of government are contract teachers promoted?	School OR Multiple levels	Local	Sub-National	National	• Expert judgment
5. At what level of government are open-ended teachers dismissed?	School OR Multiple levels	Local	Sub-National	National	• Expert judgment
6. At what level of government are contract teachers dismissed?	School OR Multiple levels	Local	Sub-National	National	• Expert judgment
7. At what level of government are principals evaluated?	School OR Multiple levels	Local	Sub-National	National	• Expert judgment
G. How much influence do teacher organizations have on teacher policies?					
Indicator	Problematic (1)	Challenging (2)	Adequate (3)	Ideal (4)	Justification
1. At what level of government is the employment relationship with teachers regulated?	School OR Multiple levels	Local	Sub-National	National	• Review of evidence • Policies of successful education systems
2. At what level of government does collective bargaining take place?	School OR Multiple levels	Local	Sub-National	National	• Expert judgment
3. For how many policy changes do teacher organizations need to be consulted?	7 or more changes	5 to 6 changes	3 to 4 changes	1 to 2 changes	• Review of evidence • Policies of successful education systems
System Capacity					

A. Are minimum standards for schools enforced?					
Indicator	Problematic (1)	Challenging (2)	Adequate (3)	Ideal (4)	Justification
1. Do those responsible for setting standards actually do so?	No		Yes		• Expert judgment
2. Do those responsible for monitoring standards for school maintenance actually do so?	No		Yes		• Expert judgment
3. What share of schools complies with maintenance regulations?	No such standards exist	50% to 69% of schools	70% to 89% of schools	90% or more of schools	• Expert judgment
4. Do those responsible for regulating the role of principals actually do so?	No		Yes		• Expert judgment
B. Are minimum standards for teachers enforced?					
Indicator	Problematic (1)	Challenging (2)	Adequate (3)	Ideal (4)	Justification
1. Do those responsible for setting entry requirements for teaching actually do so?	No		Yes		• Expert judgment
2. Are performance standards for teachers established as stipulated?	No		Yes		• Expert judgment
3. What share of primary school teachers meet entry requirements?	Less than 25%	Between 25% and 49%	Between 50% and 74%	75% or more	• Expert judgment
4. What share of secondary school teachers meet entry requirements?	Less than 25%	Between 25% and 49%	Between 50% and 74%	75% or more	• Expert judgment
C. Are regulations about teacher accountability enforced?					
Indicator	Problematic (1)	Challenging (2)	Adequate (3)	Ideal (4)	Justification

1. Are identification numbers for teachers assigned as stipulated?	No		Yes		• Expert judgment
2. Are identification numbers for students assigned as stipulated?	No		Yes		• Expert judgment
3. Do those responsible for evaluating teachers actually do so?	No		Yes		• Expert judgment
D. Are other regulations about teacher's work enforced?					
Indicator	Problematic (1)	Challenging (2)	Adequate (3)	Ideal (4)	Justification
1. Do those responsible for providing funds to hire teachers actually do so?	No		Yes		• Expert judgment
2. Do those responsible for providing professional development actually do so?	No		Yes		• Expert judgment
3. Do those responsible for funding professional development actually do so?	No		Yes		• Expert judgment
4. Are critical shortage subjects identified as stipulated?	No		Yes		• Expert judgment
Teacher Professionalization					
A. How high are the standards for the teaching profession?					
Indicator	Problematic (1)	Challenging (2)	Adequate (3)	Ideal (4)	Justification
1. What is the education level required for primary school teachers trained under a concurrent model?	ISCED 4A (post-secondary) or below	ISCED 5B (tertiary, vocational)	ISCED 5A (tertiary, academic)	Above ISCED 5A (tertiary, academic)	• Expert judgment

2. What is the education level required for primary school teachers trained under a consecutive model?	ISCED 4A (post-secondary) or below	ISCED 5B (tertiary, vocational)	ISCED 5A (tertiary, academic)	Above ISCED 5A (tertiary, academic)	• Expert judgment
3. What is the education level required for primary school teachers trained under a alternative model?	ISCED 4A (post-secondary) or below	ISCED 5B (tertiary, vocational)	ISCED 5A (tertiary, academic)	Above ISCED 5A (tertiary, academic)	• Expert judgment
4. What is the education level required for secondary school teachers trained under a concurrent model?	ISCED 4A (post-secondary) or below	ISCED 5B (tertiary, vocational)	ISCED 5A (tertiary, academic)	Above ISCED 5A (tertiary, academic)	• Expert judgment
5. What is the education level required for secondary school teachers trained under a consecutive model?	ISCED 4A (post-secondary) or below	ISCED 5B (tertiary, vocational)	ISCED 5A (tertiary, academic)	Above ISCED 5A (tertiary, academic)	• Expert judgment
6. What is the education level required for secondary school teachers trained under a alternative model?	ISCED 4A (post-secondary) or below	ISCED 5B (tertiary, vocational)	ISCED 5A (tertiary, academic)	Above ISCED 5A (tertiary, academic)	• Expert judgment
7. How many applicants are there per position in initial teacher training programs?	1 or fewer	Between 2 and 4 (non-selective)	Between 5 and 9 (selective)	10 or more (very selective)	• Expert judgment
8. How many applicants are there per teaching position?	1 or fewer	Between 2 and 4 (non-selective)	Between 5 and 9 (selective)	10 or more (very selective)	• Expert judgment
B. How much autonomy do teachers have?					
Indicator	Problematic (1)	Challenging (2)	Adequate (3)	Ideal (4)	Justification
1. What level of autonomy do teachers have over the compulsory content of the curriculum?	No autonomy	Limited autonomy	Full autonomy		• Expert judgment

2. What level of autonomy do teachers have over the optional content of the curriculum?	No autonomy	Limited autonomy	Full autonomy		• Expert judgment
3. What level of autonomy do teachers have over the choice of teaching methods?	No autonomy	Limited autonomy	Full autonomy		• Expert judgment
4. What level of autonomy do teachers have over the choice of textbooks?	No autonomy	Limited autonomy	Full autonomy		• Expert judgment
5. What level of autonomy do teachers have over the criteria of internal assessments for students?	No autonomy	Limited autonomy	Full autonomy		• Expert judgment
6. What level of autonomy do teachers have over whether a student should repeat a grade?	No autonomy	Limited autonomy	Full autonomy		• Expert judgment
C. How well do teachers perform on their job?					
Indicator	Problematic (1)	Challenging (2)	Adequate (3)	Ideal (4)	Justification
1. What share of teachers were dismissed in the last year with available data?	4% of teachers or more	3% of teachers	2% of teachers	1% or less	• Expert judgment
2. What share of teachers failed their evaluations in the last year with available data?	4% of teachers or more	3% of teachers	2% of teachers	1% or less	• Expert judgment
Incentive Structure					
A. Are there incentives to influence teachers' career decisions?					
Indicator	Problematic (1)	Challenging (2)	Adequate (3)	Ideal (4)	Justification

1. Are there incentives for teachers to teach in mother tongue languages?	No		Yes		• Expert judgment
2. How many incentives are there for teachers to teach in mother tongue languages?	1 incentive	2 incentives	3 incentives	4 incentives or more	• Expert judgment
3. Are there incentives for teachers to work in hard-to-staff schools?	No		Yes		• Expert judgment
4. How many incentives are there for teachers to work in hard-to-staff schools?	1 incentive	2 incentives	3 incentives	4 incentives or more	• Expert judgment
5. Are there incentives for teachers to teach critical shortage subjects?	No		Yes		• Expert judgment
6. How many incentives are there for teachers to teach critical shortage subjects?	1 incentive	2 incentives	3 incentives	4 incentives or more	• Expert judgment
7. Are there incentives for teachers to take on lead-teacher roles?	No		Yes		• Expert judgment
8. Are there incentives for teachers to teach difficult student populations?	No		Yes		• Expert judgment
9. Are there incentives for teachers to teach at particular grades/levels?	No		Yes		• Expert judgment
10. Are there incentives for teachers to obtain additional qualifications?	No		Yes		• Expert judgment

11. Are there scholarships for teachers to undertake further study and/or professional development?	No		Yes		• Expert judgment
B. Are there incentives to influence teachers' performance?					
Indicator	Problematic (1)	Challenging (2)	Adequate (3)	Ideal (4)	Justification
1. Are there incentives for teachers to perform well on their job?	No		Yes		• Expert judgment
2. Are there incentives for schools to perform well?	No		Yes		• Expert judgment
3. Are low-performing teachers assigned to professional development?	No		Yes		• Expert judgment
4. Are low-performing teachers assigned to a supervisor?	No		Yes		• Expert judgment
5. Are low-performing teachers removed from the classroom?	No		Yes		• Expert judgment
6. Are low-performing teachers dismissed?	No		Yes		• Expert judgment
7. Are there pay cuts for low-performing teachers?	No		Yes		• Expert judgment
8. Do high-performing teachers have access to more professional development?	No		Yes		• Expert judgment
9. Do high-performing teachers receive more public recognition?	No		Yes		• Expert judgment

10. Do high-performing teachers have better chances of promotion?	No		Yes		• Expert judgment
11. Do principals receive monetary incentives based on performance?	No		Yes		• Expert judgment
C. Are there incentives to influence teachers' effort?					
Indicator	Problematic (1)	Challenging (2)	Adequate (3)	Ideal (4)	Justification
1. Is teacher pay reduced for unauthorized absences from school?	No		Yes		• Expert judgment
2. Are there penalties for teachers who strike without having the legal right to do so?	No		Yes		• Expert judgment
D. How flexible are employment regulations for teachers?					
Indicator	Problematic (1)	Challenging (2)	Adequate (3)	Ideal (4)	Justification
1. Is there a compulsory probationary period before teachers obtain civil servant status?	No		Yes		• Expert judgment
2. What teachers are affected by the results of collective bargaining agreements?	All teachers		Only those affiliated with a teacher organization		• Expert judgment
3. What share of public school teachers are open-ended at the primary level?	75% or more	Between 50% and 74%	Between 25% and 49%	Less than 25%	• Expert judgment
4. What share of public school teachers are fixed-term at the primary level?	75% or more	Between 50% and 74%	Between 25% and 49%	Less than 25%	• Expert judgment

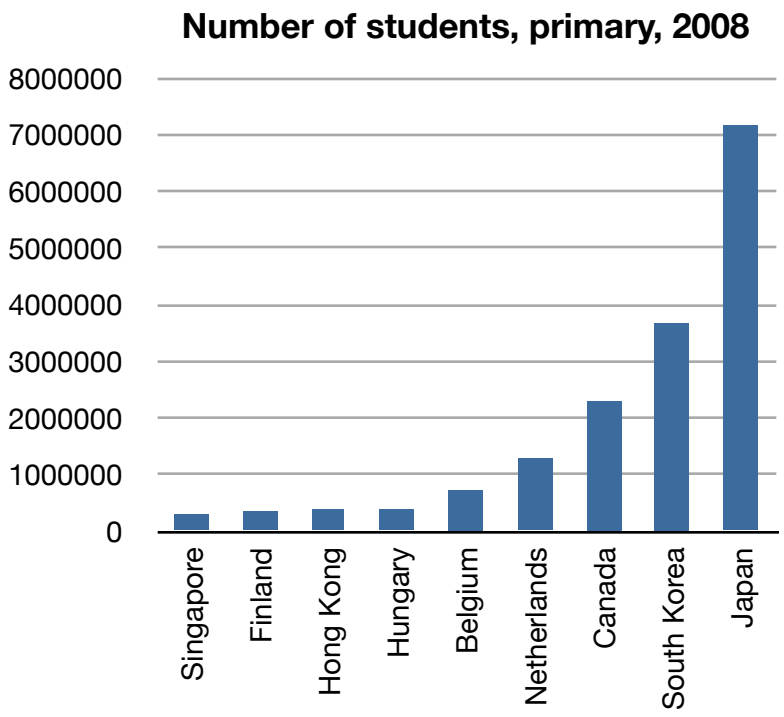
5. What share of public school teachers are on a contract at the primary level?	Less than 25%	Between 25% and 49%	75% or more	75% or more	• Expert judgment
6. What share of public school teachers are unionized?	75% or more	Between 50% and 74%	Between 25% and 49%	Less than 25%	• Expert judgment
7. What share of public school principals are unionized?	75% or more	Between 50% and 74%	Between 25% and 49%	Less than 25%	• Expert judgment

Source: *Authors' elaboration.*

APPENDIX B

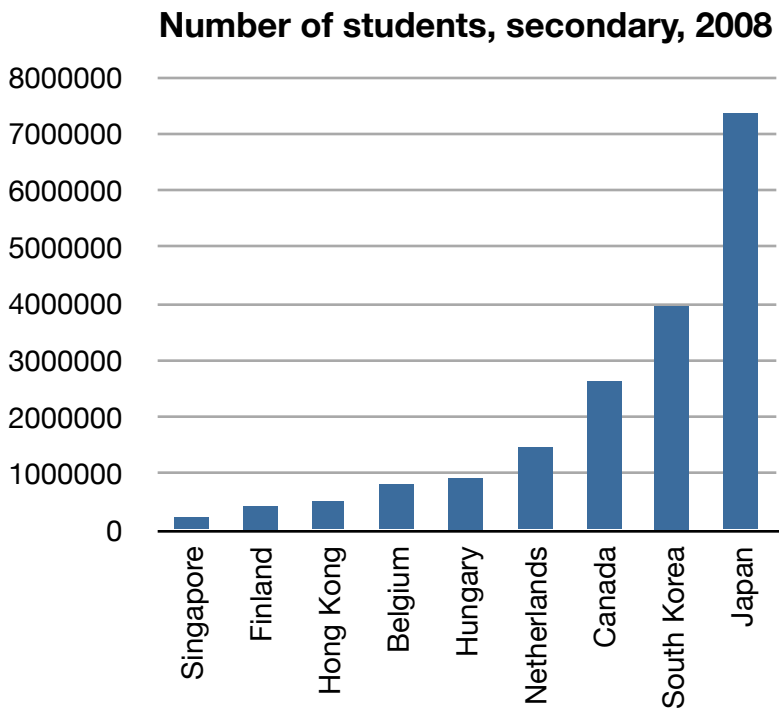
System Scope

1. How many students attend school at the primary level?



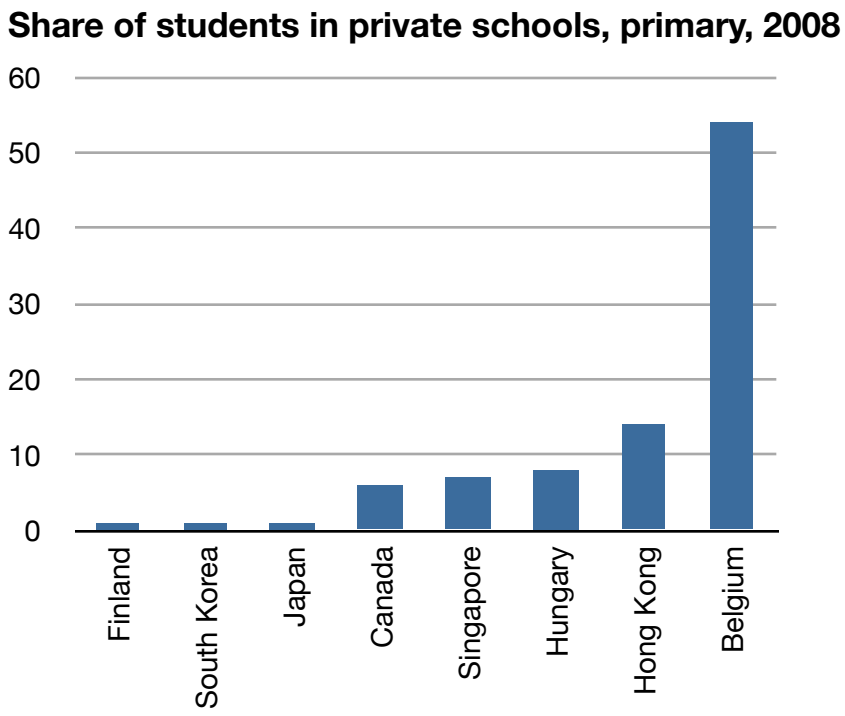
Source: UNESCO (2010). *Global Education Digest 2010.* Table 3.

2. How many students attend school at the secondary level?



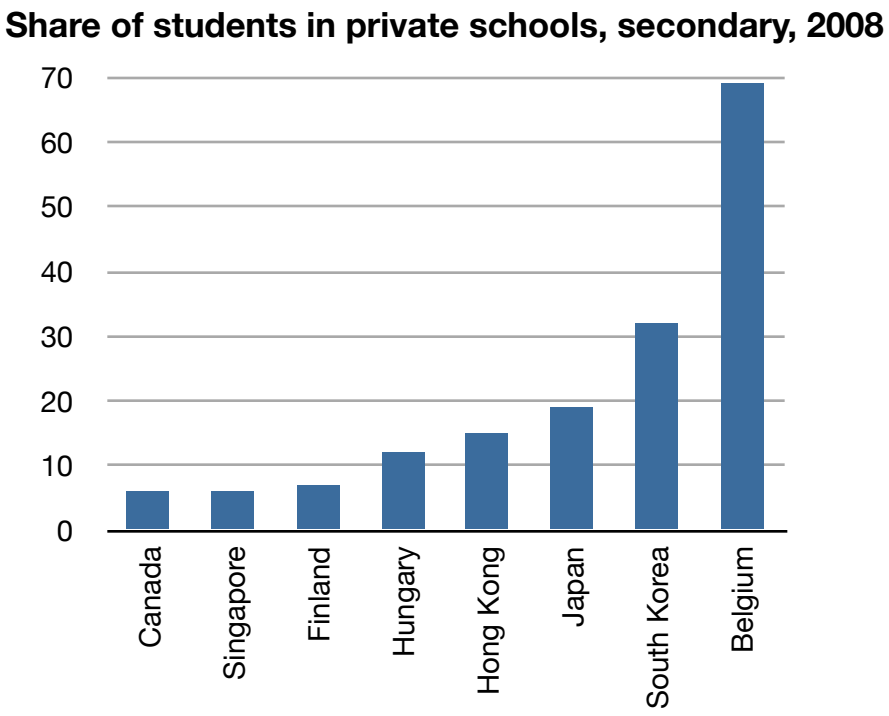
Source: UNESCO (2010). *Global Education Digest 2010.* Table 5.

3. What share of students attend private schools at the primary level?



Source: UNESCO (2010). *Global Education Digest 2010.* Table 3.

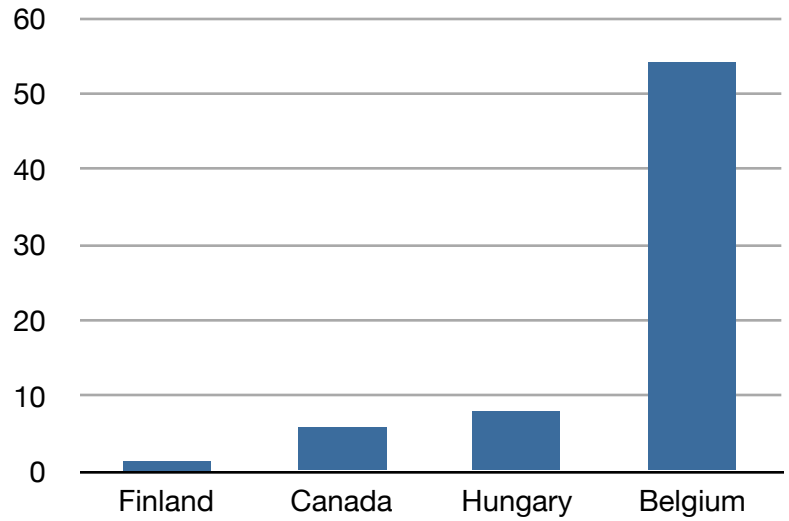
4. What share of students attend private schools at the secondary level?



Source: UNESCO (2010). *Global Education Digest 2010.* Table 5.

5. What share of students attend government-dependent private schools at the primary level?

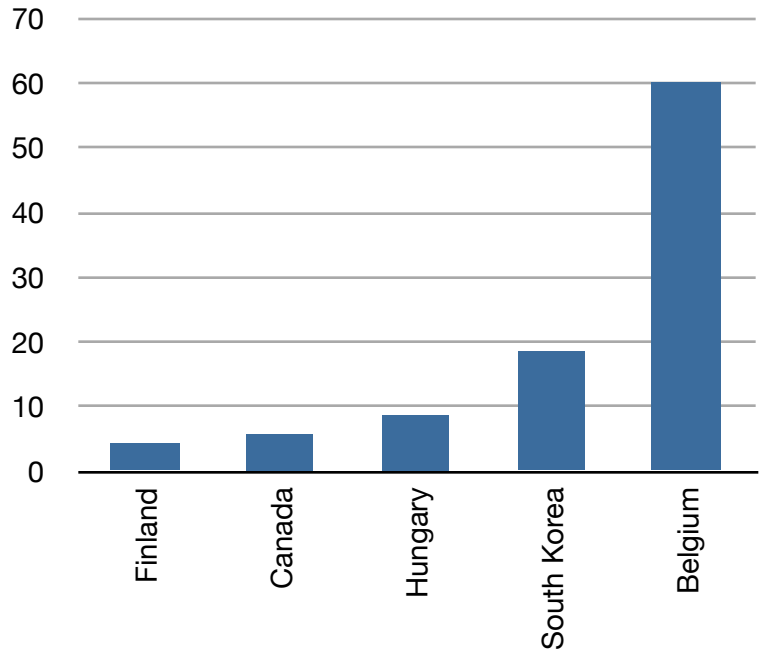
Share of students in government-dependent private schools, primary, 2008



Source: UNESCO (2010). *Global Education Digest 2010.* Table 17.

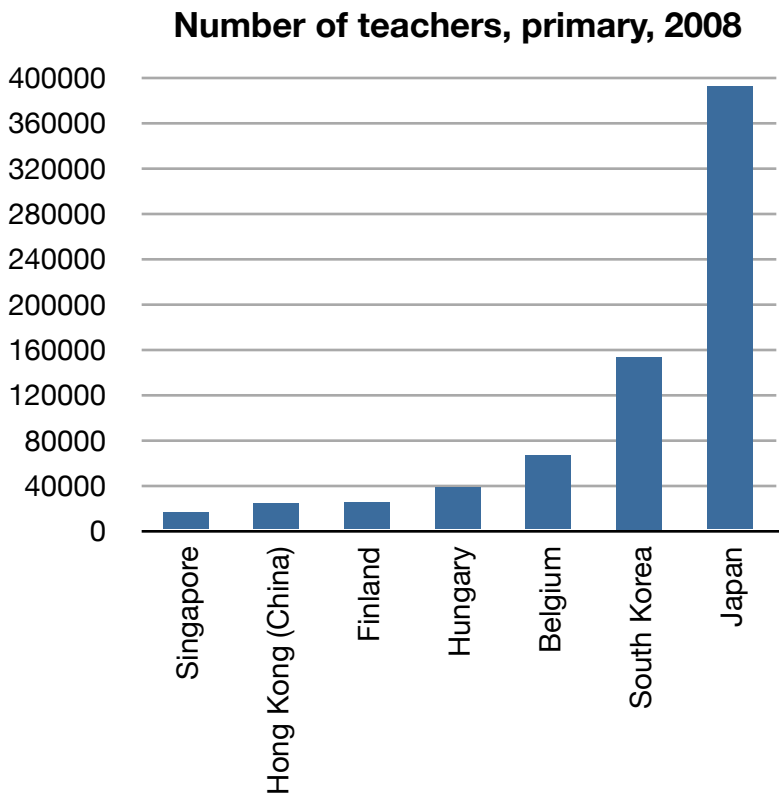
6. What share of students attend government-dependent private schools at the secondary level?

Share of students in government-dependent private schools, secondary, 2008



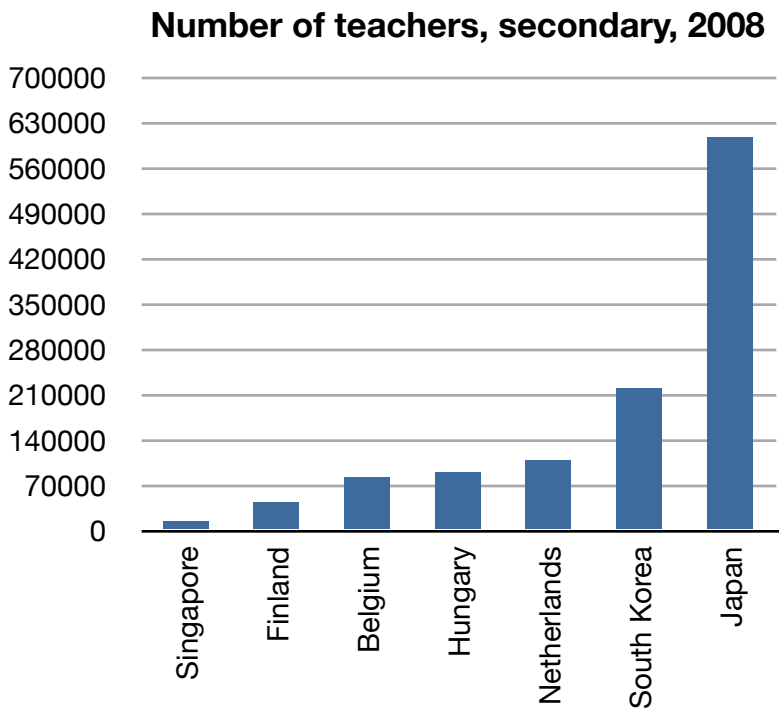
Source: UNESCO (2010). *Global Education Digest 2010.* Table 17.

7. How many teachers work in public schools at the primary level?



Source: UNESCO (2010). *Global Education Digest 2010.* Table 3.

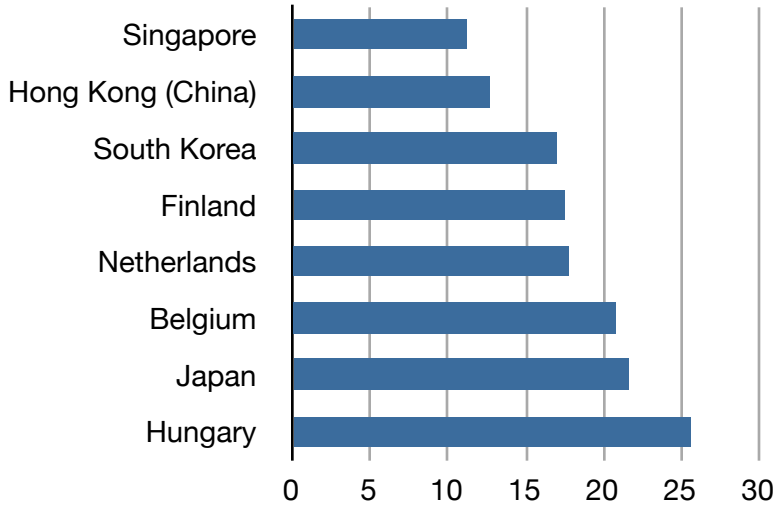
8. How many teachers work in public schools at the secondary level?



Source: UNESCO (2010). *Global Education Digest 2010.* Table 6.

11. How much is spent per pupil at the primary level (as a % of GDP per capita)?

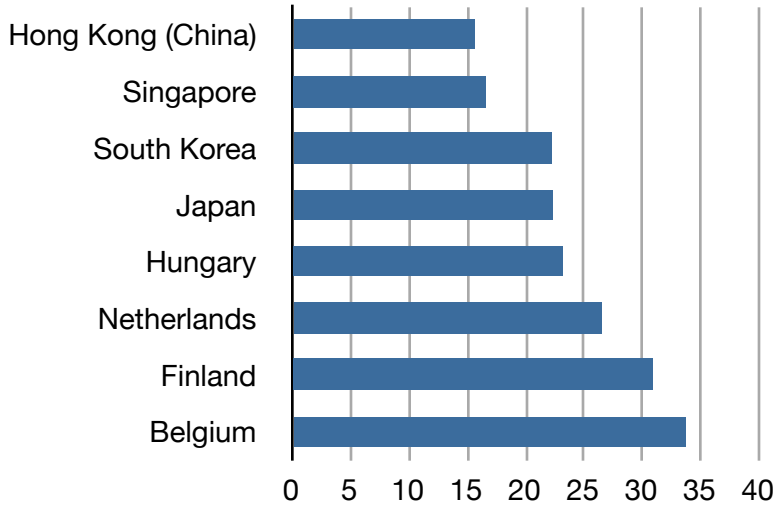
Expenditure per student, primary, as % of GDP per capita, 2008



Source: UNESCO (2010). *Global Education Digest 2010.* Table 13.

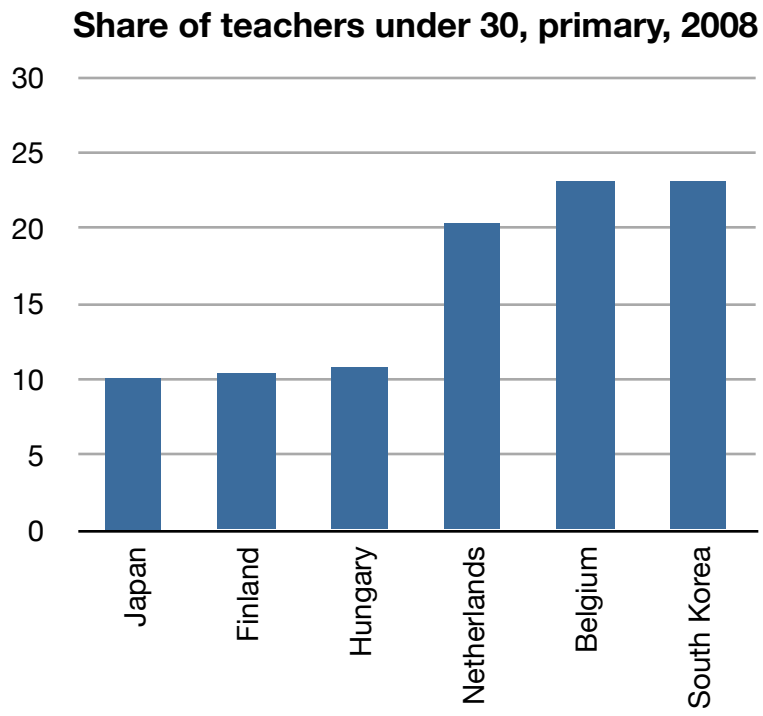
12. How much is spent per pupil at the secondary level (as % of GDP per capita)?

Expenditure per student, secondary, as % of GDP per capita, 2008



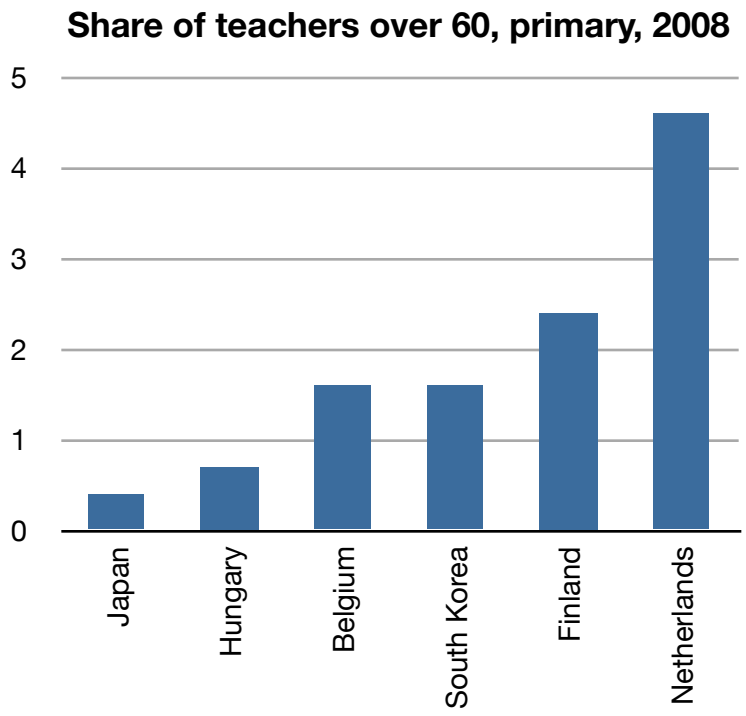
Source: UNESCO (2010). *Global Education Digest 2010.* Table 13.

13. What share of public school teachers are 29 years or younger at the primary level?



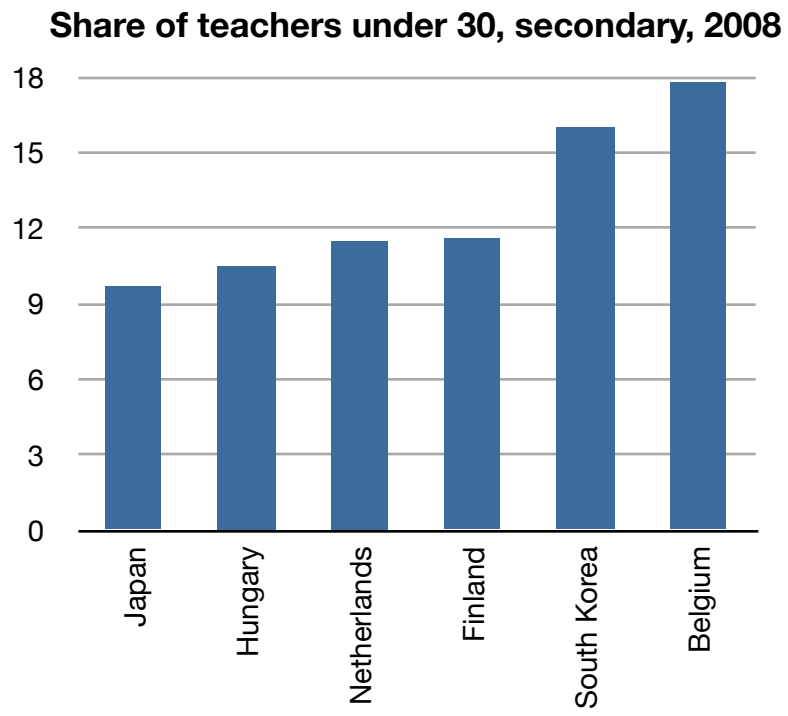
Source: UNESCO (2010). *Global Education Digest 2010.* Table 22.

14. What share of public school teachers are 29 years or younger at the secondary level?



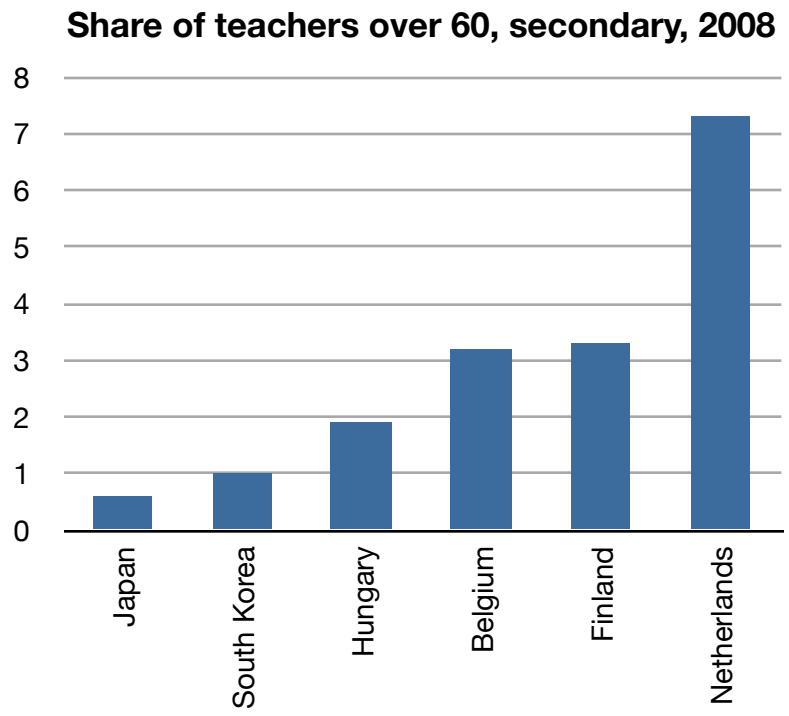
Source: UNESCO (2010). *Global Education Digest 2010.* Table 22.

15. What share of public school teachers are 65 years or older at the primary level?



Source: UNESCO (2010). *Global Education Digest 2010.* Table 22.

16. What share of public school teachers are 65 years or older at the secondary level?



Source: UNESCO (2010). *Global Education Digest 2010.* Table 22.