

The Reform of Skill Formation in Russia: Regional Responses

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Abstract

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How do developing states devise institutions to solve skill formation problems? A substantial literature has demonstrated that skill formation touches multiple collective dilemmas. The threat that rival firms will poach workers may deter firms from investing in training (Acemoglu and Pischke 1998). An apprentice wants guaranteed employment at the end of a lengthy training period during which wages are low; the employer wants commitment on the part of trainees that they will complete the training. Each fears that the other will defect from the agreement (Thelen 2004, pp. 18-19). Firms may hesitate to upgrade technology and training without assurances that complementary market infrastructure will be available (Doner and Schneider 2000). The combination of market and government failure can result in a low-skill equilibrium trap (Finegold and Soskice 1988). As a recent OECD report concludes, "Skills shortages and mismatches between the supply of and demand for skills lower potential for growth and waste resources if they are more than just temporary adjustments" (OECD 2011, p. 7).

Work in the Varieties of Capitalism (VoC) tradition has illuminated the complementarity between skill formation systems and other institutions for regulating labor markets. Following Hall and Soskice (2001), developed market economies are often classified as principally "Liberal Market Economies (LME)" or "Coordinated Market Economies (CME)." In CMEs, firms enter into industry- or nation-wide agreements that regulate training, wage formation, and social benefits. These institutionally-demanding mechanisms rest on enforcement by employer associations and centralized labor unions, and are supported by state policy. Business associations and labor unions check tendencies to defect from the agreements, keeping firms, for example, from competing on wages. Institutions enforcing cooperation across firms and labor unions over agreements regulating wages, benefits and training are often termed collectivist or solidaristic (Thelen 2001; Swenson 2001). The literature emphasizes that firms and workers benefit from the creation of a pool of industry-specific skill that complements production technologies and in turn provides some assurance to workers that investment in skill will not be wasted.

In LME's, in contrast, firms tend to rely on firm-level arrangements for regulating labor markets. Firms and workers rely on price signals to inform investment decisions. Government provides some level of universal general education, leaving workers and firms to acquire whatever firm-specific or industry-specific skill is needed to complement broad knowledge. Firms and individuals bear the risk and reap the reward of investment in new technology and skill, resulting in higher turnover of firms, higher inequality in earnings, and greater frequency of radical technological innovation (Hall and Soskice 2001).

These ideal-typical models provide valuable analytical leverage on the link between labor markets, investment and skill formation in developed market economies. They are less useful, however, in explaining outcomes in developing markets, where many of the preconditions that are assumed to exist in developed market economies are lacking. Among these are well-organized business and labor groups; relatively frictionless markets that send clear pricing signals to participants; institutions reducing transaction costs; and a state that is able credibly to commit to contract enforcement. Lacking such institutional preconditions, it is unlikely that skill formation problems can be overcome by the institutionally-complex bundles of arrangements found in LME's and CME's.

It is sometimes argued that markets for skill will clear if left alone. In the 1950s, Kenneth Arrow and William Capron argued that in a dynamic labor market--where technological progress constantly generates a demand for new skill--firms will experience

shortages in the supply of skilled labor at any given time. Equilibrium in the demand for and supply of skill would therefore only be reached at the end of the process (Arrow and Capron 1959). Such a model assumes, however, a high-information, low-transaction cost environment where labor costs send reliable signals about relative demand and where schools and other training institutions can adapt relatively quickly to shifts in demand. In practice, LME's may rely on government to regulate the market for skill as practitioners lobby government for licensing and certification requirements. Over a third of the labor force in the United States now works under one or another form of regulation of employment standards--registration, certification or licensing. As mass manufacturing employs a shrinking share of the workforce, the percentage of workers who are required to hold a license has soared. This is particularly true among the most-skilled segments of the labor force: 40% of college-educated workers now hold jobs requiring a license (Kleiner and Krueger, 2008, 2011). Licensing in LME's is one of many examples suggesting that government regulation and enforcement of labor markets is a critical precondition for solving skill formation dilemmas. Thus both CMEs and LME's presuppose relatively sophisticated institutional guarantees that investments made by workers and firms in skill will be rewarded.

Russia's transition to a market-oriented economy offers a real-time case in the formation of a new system of vocational education and training (VET) that allows us to develop hypotheses about how emerging market economies solve their skill formation problems. Russia offers several advantages for such a study. First, Russia has assigned responsibility for VET to the subnational (regional) level, permitting comparison of different regional cases. Second, Russia inherited from the Soviet state an elaborate system of vocational schools established to provide skilled workers and engineers for its economy. Much of the effort to reform skill formation in the last two decades therefore has been a matter of adapting existing institutions rather than creating them from scratch. Finally, some institutional conditions--such as the lack of involvement by trade unions in training policy and the relatively stronger role for business associations--are constant across regions. Variable, therefore, is the level of involvement by firms and governments across regions rather than the institutional infra-structure for VET.

We offer this paper as an inductive attempt to develop hypotheses based on regional case studies. In brief, our argument is as follows. Although many regions have made little or no effort to reform their systems of VET, we find that in those regions that have attempted comprehensive reform of skill formation, a combination of federal and regional government initiative was critical to ensuring success. The original impetus may have arisen from a foreign investor, a business association or a major local firm. However, in all four cases, the key to solving the commitment problems endemic to skill formation has been cooperation between federal and regional government actors which has induced investment in VET on the part of firms. We call this pattern "state-initiated coordination." The state plays the part that in LME's or CME's would be supplied by individual firms, employer associations, and trade unions in tying skill formation to regulation of the labor market.

Our findings are preliminary. They are based on a close study of four regional cases and a wider survey of many more. We believe that the pattern we identify has broader implications for the literature on social policy and institutional change in the developing world. VET provides a useful lens for studying broader institutional change because of its

centrality to economic organization, sensitivity to changing conditions, interconnections with other important institutions, and long history, a fact which has been exploited by several prominent studies of institutional change (Thelen 2004; Busemeyer and Trampusch 2012). In the case of Russia, the collapse of the Soviet Union and demise of its planned economy created a fundamental break with previous institutions, necessitating reform and adaptation. Although Soviet collapse can be regarded as a critical juncture, reform proved slow and Soviet era institutions sticky. Consequently, our work helps to identify limits to prevailing "punctuated equilibrium" models, while simultaneously exploring how and when strong states, weak markets, and weak civil society combine to shape institutional change. Substantively, VET matters, because of its effects on a broad range of social and economic outcomes ranging from global competitiveness, product market competition, inequality, and labor market segmentation (*C.f.* Crouch et al. 1999, Lauder 2001, Iversen 2005, Iversen and Stephens 2008, Iversen and Busemeyer 2012; Estevez-Abe et al. 2001, Estevez-Abe 2005, Iversen and Rosenbluth 2006; Finegold and Soskice 1988, Streeck 1992, Culpepper and Finegold 2000). In the developing world, VET is of particular importance, since broad-based investment in skills and human capital are viewed as key policy tools for escaping the "middle-income" trap and moving up the value chain (Eichengreen et al. 2013). Despite this, however, workers and employers in these countries typically condemn existing systems as providing low-quality skills unsuited to the labor market (Eichhorst et al. 2012, Biavaschi et al. 2012).

In the next section, we briefly discuss our concept of state-initiated coordination of skill formation. Section 3 then introduces the Russian case, paying special attention to the legacies of the Soviet VET system and their implications for modern Russian VET. In this section, we also highlight how the Russian VET system fared during the transition. In Section 4, we briefly discuss federal involvement in VET reform, making the case that federal authorities were important to the eventual adoption of VET reform at the regional level. Section 5 introduces four illustrative case studies to show the typical features of state-initiated skill formation regimes and how they develop. The final section concludes.

Theory

The VoC literature underscores the point that commitment dilemmas lie at the heart of skill formation regimes (*c.f.* Thelen 2004). Employers are unwilling to invest in training so long as competitors can free-ride on others' investments in skills by poaching newly trained workers (Stevens 1996). Employees, conversely, are unwilling to invest in skills without guarantees that they will be compensated with some combination of higher wages, long term employment, or generous social insurance (Iversen and Soskice 2001). In standard accounts, one of two fundamentally different mechanisms helps overcome the commitment problem. Coordinated Market Economies (CMEs) rely on cooperative agreements between firms, employees, and the state in order to ensure the provision of skill. In CMEs employer associations and labor unions jointly regulate labor markets, backed by the state, which also provides social guarantees (Estevez-Abe et al. 2001). Coordination is strategic and occurs within and between peak organizations representing business and labor, as well as between these organizations and the state (Thelen 2004). For firms, business associations serve to create a consensus among members and to negotiate on their behalf with the state and labor groups. Once agreements are reached, employer

organizations hold their membership, counterpart labor organizations, and the state accountable for complying with them. Thus, associations mitigate individual firms' fears that other employers will poach investments in skills or that labor unions will abrogate collective agreements (Swensen 2002; Busemeyer and Trampusch 2012; Busemeyer 2015). Unions serve a similar function for labor by assuring workers that employers will not take advantage of them, abrogate guarantees, or otherwise deny full returns on skill investments. Thus employer and employee groups stand as guarantors of their members' conformity to institutional solutions and collective agreements, while simultaneously insuring that their counterpart organizations do the same. The state's role is equally important, as it adjudicates disputes, provides social policy to smooth returns, and ensures that institutions and agreements function as intended (Thelen and Streeck 2009). Its impartiality is, in turn, ensured by strong peak organizations, which can hold officials accountable. Thus, business associations, labor groups, and the state all work together to guarantee that institutional commitments are credible.

Liberal Market Economies (LMEs) take a different approach to providing the guarantees necessary to ensure investment in skills. Rather than relying on strategic alliances within and between employer and labor groups, LMEs instead make use of market competition as the mechanism for coordination (Estevez-abe et al. 2001, Thelen and Streeck 2009). In LMEs, workers and firms coordinate through careful reading of market signals, which inform decisions about investment in skills. Firms compete with one another for scarce labor by offering better wages and better benefits, including in-firm training, subject to budget constraints. In LMEs, firms have no strategic way of protecting against poaching, instead relying on compensation packages and contractual relations to secure and retain skilled labor. Individuals, in turn, demand some mix of high compensation and contractual safeguards to protect against the loss of investments in skill, while relying on competition between employers and enforceable contracts to protect against defection. In such systems, a functioning labor market, rather than peak organizations, serves as the guarantor necessary to spark investment in skill. That is, the relatively free movement of the factors of production and free flow of information allow both firms and workers to rapidly reposition themselves in response to changing conditions. Commitment is ensured by competition within capital and labor, which allows firms or workers to exit relationships characterized by broken commitments. It is worth pointing out, however, that free markets in turn rest in large part on the sanctity of contracts and policy enforcement. As the ultimate enforcer of contracts and law on its territory, the state ensures that contracts signed today will be honored tomorrow, thus insuring that relationships can be formed and maintained predictably (North 1990, North and Weingast 1989). Doing so, however, requires strong political institutions: state officials at all levels must be constrained from enforcing contracts opportunistically to generate rents (*c.f.* Weingast and Moran 1983, McNollGast 1987, Beazer 2012). Hostile to collusion on the part of labor or employers, the LME state -- in theory -- opposes cooperation that restrains trade; where the state permits restricted entry to a market, it does so in order to protect a higher public interest (such as public health and safety in the case of health practitioners) (Kleiner 2000).

In settings where markets are inefficient, business and labor weakly organized, and state officials incompetent or corrupt, how can coordinating institutions emerge? One theoretical possibility is that state actors serve both as the initiators and enforcers of contractual relations among firms, and between firms and VET organizations. Relationships

within the state--among central agencies and between central and regional governments--performs the mutual monitoring functions that business and labor might fulfill in other settings. In such a model, the state plays multiple roles. First, the state serves as an aggregator and transmission belt for information about the labor market. This allows it to both direct resources to facilities that are producing high demand skill and provide information to prospective employees about which investments are most remunerative. Second, the state also forges links between employers with similar labor market needs, on the one hand, and between these employers and specific VET facilities, on the other. Linking firms generates economies of scale, decreasing the burden of skill formation costs firms. Linking these groups of firms to schools, in turn, ensures that the latter tightly meet the needs of the former. Material resources for firms and schools, including co-financing of investment as well as organizational advice, can further help lower transaction costs and aid efficiency. Finally, drawing on its role as the final arbiter of contract enforcement on its territory, the state also supervises firms to ensure that they fulfill their obligations to training, and that none are free-riding or poaching. In the case of Russia, decentralization of administrative responsibility for skill formation to the regions means that regional governments and the central government monitor each other.

For workers, the state's role in forging cooperation between firms and schools is vital. As noted above, by aggregating information from employers, the state provides prospective employees information about the labor market and the potential return on investments in skill in environments where market signals are noisy. Second, by grouping together similar employers and linking them to schools, the state also ensures employees that their skills will be both relevant and, at least within the group of firms working with any given VET facility, portable. Having multiple employers linked to any given VET facility provides prospective employees assurance about the future portability of their skill, as well as its quality. Third, for employees, the state's role as final guarantor of contracts is also valuable for ameliorating commitment problems, since the state is able to ensure that employers abide by their agreements with workers. Finally, the state can also help to surmount commitment problems between capital and labor by providing social policy benefits to ensure and smooth out employees' returns on their investment in skill.

Dispersion of authority within the state can help ensure that state commitments are credible. In a large, heterogeneous federal state such as Russia, sub-central governments may hold regulatory authority over labor markets and VET. Moreover, in a bureaucratically complex state, multiple state agencies may have responsibilities for various aspects of VET; in Russia, for example, the newly formed Agency for Strategic Initiatives (created 2011) shares responsibility for overseeing reform of vocational education with the Ministry of Education, Ministry of Labor, and Ministry for Economic Development. Such vertical and horizontal decentralization can have mixed effects. By diffusing responsibility, it can weaken the state's ability to hold firms and schools accountable for fulfilling their agreements. At worst, these overlapping areas create opportunities for officials to seek rents (Dmitrov 2009). Alternatively, the dispersion of authority can facilitate mutual monitoring among competing state agents. In democracies, elections allow the public to punish politicians for broken promises and opportunistic rent-seeking (Powell 2000; Przeworski, Stokes and Manin 1999). In authoritarian regimes, other mechanisms may facilitate accountability in the absence of electoral contestation and an independent judiciary. The central government can use performance competition among

regional officials as a way to monitor performance in achieving centrally-set goals, rewarding success and penalizing failure. Similarly, as in the "market-preserving federalism" theory, competition among regional officials can help deter predation by central and regional officials (Cai and Treisman 2006; Xu 2011; Qian and Weingast 1997; Montinola et al. 1996). The central government may also create a dedicated agency to achieve a specific policy task (Frye 2000). In each case, bureaucratic rivalries generate mechanisms for mutual oversight. Thus under some circumstances, the dispersion of authority within the state itself may be able to alleviate some of the obstacles to the state's role in enforcing commitments on the part of firms, schools and workers to skill formation.

Before moving on to our discussion of the Russian case, it is important to point out that the model of state-initiated coordination we are outlining is quite distinct from a command economy. In command economies, skill formation is incorporated into the planning system, under which the state can compel firms to cooperate with each other and workers in matching the demand for with supply of skill. Training is one more production target of the central plan. In the state-initiated coordination model, by contrast, decisions about whom to train and how derive from the production strategies of profit-seeking individual firms operating in a market environment. However noisy market signals may be, they are fundamentally different from the administrative directives of a command economy.

Legacies and Transition in Russian Skill Formation

Prior to their collapse, communist regimes used their economic planning systems to match training to production needs through a state-run system of VET (Eichhorst 2012; Saar, Unt and Kogan 2008; Matthews 1982). In the USSR, creation of basic primary-level vocational schools accompanied the crash industrialization drive of the 1930s. These were intended to give a largely peasant population rudimentary general education and basic industrial skills. The primary vocational schools added two years of training to eight years of basic general education. Later, specialized secondary institutions opened as well, that added a vocational component of four years to eight years of basic general education, enabling an individual to graduate with a secondary degree. Post-secondary specialized and polytechnical institutes offered tertiary specialist degrees as well. The system was highly centralized, and the state prescribed the curricular requirements for thousands of individual jobs.² Upon graduation, students were assigned to a job corresponding to their specialization ("*raspredelenie*"), although in many cases graduates were able to find jobs on their own.

Firms' relationship to local primary and secondary vocational schools tended to be close, as firms needed to cultivate close ties in order to have access to promising students early on. Firms commonly offered apprenticeships (*nastavnichestvo*) to complement school-based training and to attempt to tie students to the firm in anticipation of employing

² By the mid-1960s, the official register of job categories (*professii*) listed some 7000 types. They were necessarily very narrow, which in turn required a great deal of retraining as individuals were reassigned or technology developed. cf discussion of this point at meeting of State Council and presidential commission on Modernization and Technological Development, August 31, 2010 <<http://kremlin.ru/events/president/transcripts/8786>>.

them after graduation. In addition, many firms also acted as sponsors or "mentors" to feeder schools, a practice known as *sheftstvo*, in order to gain access to the most promising students. Such practices enabled firms to maintain a stream of recruits to the workforce, familiarize future employees with the skill demands of the firm, and ease the transition from school to work.

Notwithstanding the closely regimented vocational education curricula, workers still needed a considerable amount of on-the-job training. A given firm's most valuable employees were its "core" (*kadrovye*) workers, who often had high and specific skills needed by the enterprise, disciplined work habits, and demonstrated loyalty to the enterprise (Morrison and Schwartz 2003, Clarke 2007). Such workers were particularly valuable due to their firm-specific skills and ability to deal with the jury-rigged machinery and nonstandard inputs that were part and parcel of the command economy (Clarke 2007). For firms, the poaching of such workers was a perennial problem, as workers were allowed to change jobs and did so in large numbers despite nominal administrative controls over training and job assignment. Ironically, therefore, firms were forced to devise ways to retain skilled labor, making use of moderate leeway in discretionary bonuses and wages and a broad array of in-kind benefits and social facilities controlled by the firm.³ The result was a Soviet version of segmentalism offsetting the rigidities of central planning.

Thus alongside the extensive system of state-run vocational education, firms devoted substantial effort to controlling their internal labor markets by providing in-house, firm-specific training, fostering loyalty to the firm, and rewarding good performance with bonuses and other forms of incentive pay. Firms rarely cooperated directly with each other to meet their labor market needs. They instead relied on direct relationships to workers and schools to produce and retain skilled workers. What collectivist features existed, in the form of wage constraints, were centrally imposed and, in practice, were bypassed through the discretionary use of bonuses and in-kind benefits. This pattern helps explain the paradox of overstaffing at the micro-level of firms amidst a general shortage of skilled labor throughout the Soviet period, together with a high level of inequality in earnings (Granick 1954; Clarke 2007; Remington 2011).

The tight relations between VET facilities and firms did not survive the collapse of the Soviet regime. In part, this came about because of the depth of the collapse itself. During the 1990s, GDP fell by around 40%, putting immense pressure on firms. The effect of the collapse on the labor market at first appeared modest (relatively speaking) as employment fell by less than 15% (Gimpel'son and Kapeliushnikov 2011). These figures are misleading, however, as a peculiarity of the Russian labor market is that in downturns, employers tend to keep their employees on the rolls while cutting their bonuses and work hours, creating over supply of staff relative to what the firm actually expects to produce. Indeed, by 1998, about 40% of firms reported that they had more employees than they needed, given expected levels of production; fewer than 10% reported being understaffed (Gimpel'son, Kapeliushnikov and Lukyanova 2009, pp. 1-2). Demand for skilled labor therefore fell across the economy.

³ Discussions of compensation under the Soviet system may be found in Clarke 1996, Gimpel'son and Kapelyushnikov 2011, and Remington 2011. For more on provision of social services by firms, *c.f.* Commander and Jackman, 1997.

At the same time, spending by the state and by firms on support for vocational schools dropped sharply in response to the economic crisis. The former practice whereby firms acted as sponsors of vocational institutions disappeared in many places as laws dictating that firms provide social services were removed from the books and firms took advantage to cut costs. Similar trends were observed in all the former socialist countries as they embarked on their transitions to market-oriented economies (Saar, Unt and Kogan, 2008). As firms severed their relationships with schools, the latter increasingly had to look to other sources of funding. The situation was grim, however. Even today overall education spending as a share of GDP in Russia is under 5%, compared to 6.3% on average in the OECD, and over 7% for some developed countries (OECD 2013, p. 182). Spending on *vocational* education as a share of this total is particularly low – around 1% of total spending – with the bulk concentrated at the tertiary level and not on the types of secondary education that provided many specialized industrial skills (*Indikator obrazovaniia 2013*). Much of what funding schools could find came from the Russian state, which in contrast to many countries finances the majority of the spending on vocational education (over 80% for secondary vocational schooling, 60% for tertiary). Non-state spending lags well behind other developed countries, however, with most of the spending coming from individual households. Retreating from their Soviet era commitments, firms have accounted for only about 12% of the total spending on higher vocational education (*Obrazovanie v RF 2012*).

The difficulties schools faced were exacerbated by problems attracting talented students – regardless of their ability to pay tuition. The end of the old state job assignment system and the command economy also meant the end of state controls on access to tertiary education. The perceived prestige of tertiary education, and falling prestige of primary-level vocational education, helped to stimulate declines in enrollments in primary-level vocational education in the 1990s and 2000s, and a steep increase in enrollments in tertiary institutions. This surge in enrollments had multiple consequences. One was a negative selection effect for the quality of students in secondary and primary vocational schools as gifted pupils pursued more high prestige placements (*Strategiia-2020 2013*, p. 280). As many experts observed, vocational schools are widely seen as shelters for problem youth.⁴ Another was a lowering of educational quality in many higher educational establishments as schools attempted to attract newly interested students and deal with the mass influx. Finally, and perhaps most importantly, the surge also lent itself to a large expansion of education in fields such as management, economics and law, decreasing the candidate pool interested in more traditional VET specialties.

The heavy tilt of the education market towards management, economics, law, and other specialties requiring tertiary education had important consequences for employers. Returns for these fields were initially high, as they had been neglected in the planned economy (Brainerd 1998; Svejnar 1999) and the general nature of such skills made it easy for graduates to find jobs. Nonetheless, studies of wage premiums to education indicate that the return on investment in higher education began falling in the latter half of the

⁴ Such comments are widespread. Examples may be found in a discussion chaired by then-president Dmitrii Medvedev of the State Council and the Council on Modernization and Technological Development, August 31, 2010:

<<http://kremlin.ru/events/president/transcripts/8786>>

2000s, consistent with an oversupply on the labor market and weaker occupational demand (Mirkin 2008). In some fields that were previously most popular – education, economics, law and management – the wage premium to education turned negative, whereas in specialties tied to manufacturing, transportation, communications, and health care, the premium remained positive (Andrushchak and Prudnikova 2011, pp. 30-1). In engineering, by contrast, where the demand for tertiary education is relatively low, the return on investment remains high (Carnoy et al. 2012, p. 18).

For employers skill became a serious problem as economy recovered in the early and mid-2000s and firms began to expand. Demographically, firms faced a constant drain on their existing stock of skilled workers as the Soviet era workforce began retiring, draining firms of the supply of skill that had carried them through the transition years. Moreover, the bias towards tertiary education that developed during the transition made it difficult to replace these workers, as many of the best candidates went to universities rather than VET. The low numbers of graduates of primary and secondary vocational schools was compounded by their poor quality, as underfunded schools struggled to modernize their curricula in the absence of firm partners and experience with markets. Indeed, schools were increasingly reliant on state funding and the state, for its part, mostly evaluated them on the basis of the number of diplomas they produced, not the skill qualifications of graduates or the ability to meet industry need (WB/HSE 2013, p. 11). Indeed, a survey by the RSPP determined that only 16% of firms considered graduates' skills adequate or more adequate than not; the rest were more dissatisfied or could not give a definite answer (RSPP, "Professional'nye kadry," 2013, p. 10). Another survey of firms found that nearly three quarters rated the quality of graduates of vocational higher educational institutions as no higher than 3 on a scale of 1 (lowest) to 5 (highest) (*Strategiia-2020* 2013, p. 280).

Unsurprisingly given the circumstances, firm surveys found that managers considered the shortage of skilled labor to be one of the top three obstacles to firm performance (along with high taxes and unpredictable regulations).⁵ Business associations echoed the complaint. A 2012 survey of 6000 businesses conducted for OPORA, the association representing small and medium-sized business, found that two thirds of their members considered the insufficiency of personnel a serious problem. High taxes and difficult access to finance followed (OPORA-2012). Similarly, a survey of its member firms by the Russian Union of Industrialists and Entrepreneurs found that 64% of firms considered the shortage of skilled labor to be one of the most severe problems facing them (RSPP, "Doklad o sostoianii delovogo klimata v Rossii v 2010-2013 godakh," 2013 , pp. 30-1). For comparison, a PWC survey found that 85% of Russian CEO's were concerned or extremely concerned about the shortage of skilled labor and considered it a threat to economic and political stability, as against 71% and 70% other BRICS countries and the US, respectively (PWC 2014, p. 15).

Some labor economists have argued that complaints of firms about skill deficits are disingenuous, since the average share of the wage fund spent on training in the manufacturing sector, for example, is no more than .7%, several times lower than the

⁵ Business Environment and Economic Competitiveness Surveys, International Institute of Market and Social Research GfK-Rus'. Conducted by Ministry of Economic Development, Higher School of Economics, and Levada Center (2005, 2009).

European Union average (Gimpel'son 2010; *Strategiia-2020* 2013). A 2005 firm survey found that about 70% of firms released employees from their jobs for training in the previous year, either at an institution outside the firm or through a training course administered by the firm.⁶ However, a third of firms sent no skilled workers for such training, and 40% sent no more than 10% of them. Two thirds of firms sent no more than 10% of specialists (engineers and technical specialists) to training courses. A 2009 firm survey found a similar pattern, with about half of firms having sent employees for some training in 2008, although more than half of these sent no more than 5% (Gimpel'son 2010, p. 51). Such economists further argue that many loss-making firms that would not survive in a fully competitive market economy stay in business, tying up resources, thanks to infusions of support from the state. They create an inefficiency trap in which relatively unproductive labor is employed at non-competitive firms that lack the means to upgrade technology and skill (Gimpel'son 2010, p. 26; Gimpel'son, Kapeliushnikov and Lukiyanova 2009, p. 15). Consequently, firm complaints have more to do with an unwillingness to pay for skill training and a misallocation of what skilled labor exists than actual skill deficits.

While we would not necessarily take issue with this interpretation, it is important to note that to the extent that firms want skilled workers and cannot get them at affordable prices, a school-based system of VET becomes an attractive solution for firms. This is particularly true in view of the high rate of employee turnover. The same 2009 survey that identified underinvestment by firms in the skill of their workers also found that 30% of employees had left the firm in the previous year, and about 25% of the workforce had been newly hired. This level of churn undercuts firms' motivation to provide training since it is cheaper to hire already trained workers than to devote firm resources to training them (Gimpel'son 2010; Gimpel'son, Kapeliushnikov and Lukiyanova 2009). Under such circumstances, it would be irrational for a firm to invest in training, since doing so would invite rivals to free-ride by poaching skilled employees.

Given these problems, what conditions would favor the emergence of an LME or CME regime? In a Coasian world with low transaction costs, liberal market institutions might resolve the problem of the skills mismatch. Individual firms could invest more in training; proprietary skill providers might seek to fill market niches; private individual spending on VET might rise. Alternatively, in an institutionally-dense environment featuring strong employer and labor associations, we might envision coordinated market solutions. And indeed, as the case studies related below indicate, we see evidence for both types of response. However, as we shall argue, neither perspective adequately captures the most important patterns of initiative and constraint in the reform of vocational education observed in Russia. One reason is that the institutional conditions that would foster both paths of development are lacking, while the legacy of centralized state administration remains powerful.

State-Initiated Coordination in Russia: the Federal Perspective

⁶ Business Environment and Economic Competitiveness Surveys, International Institute of Market and Social Research GfK-Rus'. Conducted by Ministry of Economic Development, Higher School of Economics, and Levada Center (2005, 2009).

Given the issues identified above, it is not surprising that Russia has faced serious collective dilemmas affecting skill formation. A 2013 World Bank-Higher School of Economics report on skill noted that incentives of the major actors were misaligned. Neither the vocational educational institutions--particularly those at the tertiary level--nor the enterprises had sufficient incentive to invest at scale in the types of skill required by industry. Meantime, educational establishments were evaluated on the basis of the number of diplomas they produced, not the skill qualifications or match to industry needs of their graduates (WB/HSE 2013, p. 11). Students, for their part, seem to either highly value professional prestige or to be inadequately informed about returns on investment for blue-collar specialists, thus causing them to flock to white-collar programs that teach low demand skills. Firms' unwillingness to send strong signals by investing in their employees' education and the uncertain quality of schools made flight into white-collar work, if not rational, then certainly understandable. A 2008 report prepared by the Russian government based on interviews with educators, firm directors, parents and young people, quoted one firm manager as observing:

I might need an engineer-technologist or a construction-engineer. But I alone am not capable of paying for his training at some institute. The VUZ needs to gather a group of students for the training, but I don't need a group--only need 3 or 5 specialists. What to do? I have to cooperate with someone. And the employers will cooperate, but they also are not enough to reach a group. Without the help of the state that Technical Institute simply cannot provide training to the group that formed (Mirkin 2008, p. 122).

This dynamic has all the hallmarks of a classic collective action dilemma: all would be better off if there were a more effective system for matching the demand and supply of skill on the labor market. But for no one side is there sufficient incentive to assume the disproportionate initial cost and risk of investing in a major overhaul of vocational education.

Beginning in the late 2000s, the federal government began to address the problem. Although the Russian federal government took some halting steps at reform in the 1990's, VET began to assume higher national priority when Dmitrii Medvedev, then first deputy prime minister, took over administration of the federal target program for education in 2007. During his time as prime minister, and continuing as he became president 2008, Medvedev consistently used the federal program to induce regional governments to compete for federal matching funds to complement local government and business financing. His interest became more explicit in 2010, when as president, he chaired a joint meeting of the State Council (the advisory body of regional chief executives) and his presidential Commission on Modernization and Technological Development devoted to the reform of vocational education. Declaring that the current system was highly inefficient, he accused it of having an overly rigid and uniform curriculum, insufficient connection to market actors and market needs, lacking in independent assessment of results, and serving as a "social shelter" for youth rather than training for the needs of the economy.⁷ Following

⁷ <<http://kremlin.ru/events/president/transcripts/8786>>; <<http://proftech.ntf.ru/node/97#>>

this meeting, on September 9, 2010, he issued instructions to the government to hold a competition for regional reform plans under the auspices of the federal education target program. The government formally announced the competition on June 2 of the next year.⁸ The competition was designed to spur regions to reform their vocational education systems over the 2011-2015 period on the basis of co-financing by the federal government, the regional government, and local employers. An unknown number of regions submitted plans; thirty were selected for subsidies. Strikingly, regional interest in these plans comes despite the relatively modest pools of money the federal government was actually offering the regions. Total spending in the first three years was about 17 billion rubles, but only 1.5 billion came from the federal budget. Almost two-thirds, slightly over 11 billion, came from regional budgets. Another 3.8 billion was spent by firms, and 1.2 billion by business associations.⁹ Medvedev also declared that the federal government would cease funding vocational education and training altogether, apart from the federal grants competitions, and that regional governments would be entirely responsible for administering vocational schools and training centers. This decision was incorporated into the 2012 federal law on education. Under Medvedev, therefore, the federal government combined carrots and sticks in dealing with regional governments in skill formation.

Governors could choose how to respond to the federal initiatives. On the one hand, reform was administratively demanding and the federal incentive funds were modest. Many regions therefore passed up the opportunity. On the other hand, the fact that President Medvedev made VET a regional priority made it an attractive way to gain the attention, and approval, of central authorities. For some regional governors, this attention was an appealing way to fortify their standing in the federal government's eyes. After 2005, and until 2012, regional governors were appointed by the president. Although unofficially, the most important criteria for reappointment was the contribution of regional governors to the vote total of the hegemonic United Russia party, officially governors were evaluated on a large number of criteria. The Ministry of Regional Development was tasked by presidential decree to develop and manage an overall performance ranking of governors based on 82 criteria for assessing socio-economic effectiveness of governors in Russia's regions. While the components of this index were usually drawn from public data, the method for compiling them was never publicly revealed (MinRegion 2007; Reuter and Robertson 2013). As a consequence, many governments had to decide which performance targets were most important--after, of course, ensuring solid margins of electoral victory for Putin and United Russia. This fact allowed governors to choose among strategies of rule, some focusing on economic development of their regions, others on patrimonial control. Some chose to overhaul VET as part of a strategy to attract investment or win federal procurement orders. Grant contests for federal co-funding for new VET programs allowed governors to demonstrate their zeal in complying with federal priorities. More importantly for our purposes, they also created a three-way commitment mechanism: regional governments could point to federal attention in assuring firms of their seriousness, and in turn hold the federal government responsible for providing the promised funding, while ensuring that firms in turn met their own commitments. In this

⁸ < <http://proftech.ntf.ru/node/97#>>. In fact, for reasons that are unclear, the government held two competitions simultaneously.

⁹ <<http://prof-education.ru/node/6322>>

sense, the commitment mechanism is more important to the success of the reform than the federal funding itself.

The importance of commitment as a key motivator for regions becomes even more apparent when one considers a 2013 contest intended to encourage regions to adopt dual education run by the Agency for Strategic Initiatives (ASI), an arm of the government created in 2011 to encourage the development of medium-sized business.¹⁰ ASI declared that winners in this competition would not receive any federal funding at all, just advice and other organizational aid. Nonetheless 23 regions entered the contest, five of which were declared winners. All were obliged to demonstrate co-financing by the regional government and business in order to win. One of the Russian officials in charge of the dual education program made explicit that the implicit guarantee of the federal authorities was crucial in securing business cooperation in remarks at a conference in Berlin in February 2015:¹¹

The value of our experiment lies in the fact that its realization is supported by the top leaders of the winning regions and is under the constant supervision of the ASI and 3 federal ministries: Ministry of Economic Development, the Ministry of Education and Science, and the Ministry of Labor. Such attention to the course of the adoption of elements of the dual system of education allows us to hope that winning regions will raise their investment attractiveness for foreign enterprises, and already now we are accepting proposals for participation in our experiment from foreign colleagues, for example Südzucker AG, a large German producer, which is planning its development on Russian territory.

The advantage for regions therefore lay not in the material stimulus, but rather in the signal sent by the success of the proposal. Presumably the region could have adopted the dual education system without entering the contest, but federal attention helped to ensure that all sides would fulfill their commitments to the reform.

There can be little doubt that the federal role in combining administrative mandates, such as terminating mandatory federal funding for vocational education, and competitive incentives for reform, has been central to the evolution of regional responses to the skill formation problem. More fundamentally, it suggests that the state's role, whether that of regional or federal government, has been crucial both in stimulating and enforcing institutional solutions to the collective dilemmas posed by VET reform. In a country lacking in cohesive labor organizations, bargaining by peak employer and labor associations has not been the source of change in labor market regulation. Business associations have played a role, labor associations almost none. Judging by the evidence of central-level policy, however, state initiative has been central. This is hardly surprising, in

¹⁰ ASI is an example of a special-purpose agency created outside of existing agencies. Its mandate is to stimulate the development of medium-sized enterprises. It uses a variety of tools, such as grants competitions, to achieve its goals. It competes indirectly with other ministries, but has a separate mandate and funding stream. See Freinkman and Yakovlev 2014.

¹¹ <http://www.asi.ru/news/16618>.

view of the legacy of state dominance of society in Russia. However, it has led Russia along a path that corresponds to neither an LME nor a CME model.

Russian VET: Four Regional Cases

In this section we detail our conception of state-initiated coordination in skill formation by examining four regional case studies. Before selecting these cases, we studied a large number of Russian regions, searching for regions where firms, government, and schools developed new forms of cooperation in skill provision. Our first cut was to consider those that won the 2011 and 2013 federal competitions to upgrade training programs. The ministry chose these winning regions on two criteria: the regional program clearly targeted its vocational education efforts on top-priority economic branches and regions were willing to engage in co-financing arrangements with the federal government. These were not unduly demanding criteria, as 45 regions were chosen to receive federal grants in 2013.

We looked for evidence of a high level of institutional involvement in regional VET by government, business, or both. Based on our examination of the sources, we uncovered several types of investment in skill formation. Some are collectivist, in that they serve multiple firms in a sector or a region. Others are segmentalist, in that they establish deep cooperation between particular firms and particular schools. Firm involvement in VET can range from relatively modest forms, as when enterprises simply accept students for practicums (short unpaid internships), participate in evaluation commissions, organize site visits, sponsor contests of vocational skill, or require their employees to undergo retraining. Others engage firms in comprehensive partnerships with schools in which enterprises conclude comprehensive contracts with schools for close collaboration in training. In such cases, the firm typically guarantees students stipends during study and jobs upon graduation, sets curriculum of schools, supplies equipment and employees to aid in training, and in some cases arranges for a large proportion of instruction to be carried out at the firm itself. German-style "dual education" programs, in which firms formally contract with schools to complement classroom instruction with in-company training delivered by master instructors, represents an institutionally-intensive form of firm engagement in VET. Even though it may be regarded as a segmentalist solution to training, it nonetheless requires means to enforce commitment on the part of schools and firms.

Similarly, we conceive government involvement as ranging from lower to higher levels. Government involvement is low if government funds schools but does little else. It is medium if government facilitates contracts between firms and schools. Finally government involvement is high if it signs three-way contracts with schools and firms, establishes new facilities such as regional or sectoral training centers, or creates new structures to coordinate labor market demands with vocational education.¹² Our conception of state-

¹² We note that our scheme is similar to one proposed in Busemeyer and Trampusch, 2012, p. 12. In their typology, liberal societies are low in both government and industry investment; collective are high in both; statist are high in state involvement but low in firm involvement, and segmentalist are high in firm involvement but low in state involvement. We note a range of variation across Russian regions corresponding to these ideal types.

initiated coordination corresponds to cases where both government and firm involvement is high, whether these are segmentalist or collectivist.

Based on these criteria, we chose Kaluga, Nizhnii Novgorod, Perm', and Belgorod for closer examination. Our data come from federal and regional websites and reports, the regional and national press, scholarly publications, and reports from think tanks and business associations. We have also conducted interviews with participants and experts.

We qualify our results in two ways. First, we do not claim to understand why some regions have undertaken institutional reform and others have not. In a follow on project, we gather data on the contracts signed between regions, schools, and firms in order to get at this question. We offer these case studies to indicate how state-initiated coordination came about in practice. Thus we do not attempt to make causal claims. Second, our case regions are not chosen to be representative of the full range of possible patterns. We deliberately selected on the dependent variable to identify possible commonalities among them. By using process-tracing to uncover the sequence of actions by the federal government, regional governments, and firms, we developed testable hypotheses about necessary and sufficient conditions for successful reform.

To suggest how our four test regions compare to others, we present Table 1, which includes summary statistics for our four cases and compares them to various summary statistics drawn from the full set of Russian regions. All four regions are slightly richer than the median or mean Russian region, as indicated by the inflation-adjusted figures for gross regional product per capita and income. Otherwise all fall well in the middle of the ranges of other indicators, and none is at the top or bottom in any of the selected measures. The table indicates that the regions we select are not exceptional across a number of potential economic factors that could explain adoption of VET.

Table 1: Case regions in comparison to the population of Russian regions

	GRP pc adjusted, 2010*	democ score**	poverty rate 2010	primary share, 2012**	adjusted income, 2010*
Perm'	39.14	38	13.2	16.1	3.25
N. Novgorod	34.27	34	12.3	3.2	2.90
Kaluga	34.70	29	11.3	8.6	2.94
Belgorod	54.25	22	8.2	29.5	3.56
all regions:					
median	29.29	26.00	14.90	13.30	2.67
mean	34.95	26.62	15.08	18.36	2.79
min	9.33	16.00	7.50	0.00	1.57
max	171.79	41.00	35.70	79.40	5.09
cv	0.63	0.22	0.31	0.81	0.24

*Inflation-adjusted figure represents multiple of regional subsistence minimum

**Democracy score: Petrov/ Carnegie expert ratings of democracy in region, 2001-06

*** Primary share refers to share of total regional output contributed by agriculture, extractive, fishing and timber industries

Source: Rosstat, various years; Carnegie democracy ratings
<http://atlas.socpol.ru/indexes/index_democr.shtml>

Belgorod--vocational education reform as a signature project

In Belgorod oblast', a major impetus for the development of VET was the formation of the giant agricultural holding company Agro-Belgor'e in 2007, which operated a large number of pig and dairy farms, as well as food processing facilities.¹³ This firm was the first, to our knowledge, to begin establishing deep connections with regional schools in order to supply itself with skilled labor. Indeed, so impressive was the effort that its initiative in reforming VET became the model actively promoted by the governor, Evgenii Savchenko, as the ideal for the entire region. Although Agro-Belgor'e and Savchenko claimed to take action on VET independently of events elsewhere, the timing of their actions suggest that the firm and regional government were responding to a federal initiative in devising the scheme.

In August 2011, Agro-Belgor'e signed a three-way agreement with the regional government and the administration of a local vocational school--the Dmitrievskii technical school--under which the holding company would assume responsibility for the school and in turn hire its graduates at decent pay.¹⁴ The company also agreed to adapt the German dual education model, committing the firm to provision of systematic in-house instruction to complement the training at the reformed school. The firm spent some 55 million rubles, not just on upgrading equipment, but also in providing for the living conditions of the students.¹⁵ Agro-Belgor'e not only donated new equipment to the school, but also reformed the curriculum by adding specialties such as veterinary care and agronomics and dropping outdated ones. This allowed the school to be upgraded to the status of a *tekhnikum* (ie a specialized secondary school). Under the agreement, the instructional staff was to undergo retraining at the company to better teach. A pilot program to train 20 tractor operators began in September 2011, within weeks of the agreement.¹⁶

It is clear that a good deal of preparatory work went into this agreement and that the regional and federal governments contributed the lion's share of the funding for it. Recall that President Medvedev declared that regions were now responsible for financing and reforming their own vocational education systems through joint funding from firms and regional governments, and that in June 2011 the federal government launched a competition for regional reform programs for the 2011-2015 period. Within weeks, on July 11, 2011, the Belgorod regional government published a comprehensive four-year plan (2011-2015) for reform of vocational education.¹⁷ Two weeks later it created a quasi-government agency called the "institute of regional cadre policy" to serve as intermediary

¹³ <http://www.agrobel.ru/>

¹⁴ September 2, 2011. <http://www.agrobel.ru/presscenter/smi_o_nas/1945>

¹⁵ T. Soboleva, "Vam kart-blansh, gospoda!" *Belgorodskaiia pravda*, August 7, 2011
<<http://www.belpravda.ru/?q=node/831>>

¹⁶ On the Dmitrievskii school: <<http://www.agrobel.ru/h/vocational-school/institution/>>

¹⁷ <http://docs.cntd.ru/document/469024702>

between firms, schools, and government on training issues.¹⁸ No more than a week or two later, the government, Agro-Belgor'e and the Dmitrievskii school signed their three-way agreement. At that point, Governor Savchenko began demanding that all vocational education schools be absorbed into large "anchor" companies and working closely with them on the basis of the dual education model, following the example of the Agro-Belgor'e experience.¹⁹

While the press sources do not illuminate the intervening steps, it is reasonable to infer that the governor and director of Agro-Belgor'e cooperated in taking advantage of opportunity. Regional and federal funding would allow the holding company to transform local VET in such a way as to serve its cadre needs. In turn, the governor could cite the Agro-Belgor'e example as a model of the kinds of reform he proposed to carry out throughout the region. Federal recognition, and funding, helped to cement the agreement. The level of complexity of the 2011-2015 plan (it runs more than 50 pages) clearly indicate that it was drafted over a period of many months, no doubt with the involvement of Agro-Belgor'e and other firms. Its timing strongly indicates that it was prepared expressly for the federal grant competition. Indeed, the head of a local organization involved in the program told us in an interview that the program was entirely the region's initiative and based on the region's needs. The small amount of federal funding relative to local funding makes it doubtful that the federal funding itself was the main impetus. Rather, it is likely that, as in the other regions we examined, federal attention served as an institutional guarantee to the regional actors – firms and government – that each side would uphold its end of the bargain. The fact that the governor could then receive national acclaim as the champion of a successful model was an additional fillip. Even if Savchenko's chances of being promoted to a higher office at the federal level are negligible, recognition that he had carried out a major policy reform in an area of interest to the federal government helped consolidate his power at home.

The model of enterprise takeovers of schools, accompanied by a thorough overhaul of their curricula and equipment, became a centerpiece of Governor Savchenko's strategy for economic development of the region. As he regularly points out to managers, to the extent that they take responsibility for vocational education, they will benefit by developing a stream of skilled labor for their own needs. He also urges vocational schools to find themselves "anchor" firms as sponsors. Under the governor's persistent pressure, firms and schools have established extensive bilateral ties. By mid-2013, two thirds of the region's specialized secondary schools had found sponsoring firms.²⁰ In many cases, the government signed three-way partnership agreements with schools and employers specifying how the schools will be funded, in what specialties they will provide vocational

¹⁸ <<http://irkp31.ru/><; <<http://www.irkp31.ru/institute/about/>>

¹⁹ <http://www.bel.ru/news/education/57678.html>>; «Агро-Белогорье» взялось за своё училище, 28 сентября 2011.

<<http://www.bel.ru/news/education/57678.html>>

²⁰ T. Soboleva, "Mnogo generalov, a soldat tak malo...", *Belgorodskaiia pravda*, June 26, 2013
< <http://www.belpravda.ru/?q=node/2419>>

education, and how the dual education system will be implemented.²¹ The template is that the government provides basic financing to the schools so long as they meet particular standards, while firms supply the equipment and take on administrative functions including evaluating the quality of the training. Students sign contracts with the government (or firm) under which they must repay the cost of their education in the event they do not take the proffered job.²² The governor has also encouraged schools to develop their own income streams. One polytechnical school for the construction industry makes furniture both for its own needs and to fill consumer orders. As the director put it, "50% of the school's funding comes from the oblast, 50% from the sponsoring enterprise, and another 50% from its own earnings. 50 plus 50 plus 50 equals 150."²³

Savchenko's reforms of VET include collectivist elements as well. For example, Savchenko created regional-territorial employer councils as mechanisms to assay firm forecasts for labor and generate aggregate orders for schools without bilateral ties to specific firms to train the desired number and assortment of specialists for those firms who are likewise unconnected to a specific school. In 2013 the regional personnel department created a non-commercial agency for developing a system of independent assessment and certification of skills, with a board that includes representatives of business (including the head of Agro-Belgor'e).²⁴ At the beginning of 2014 this agency held a conference with the heads of the major firms, schools, training and personnel organizations, and employer associations to draw up a plan for evaluating and certifying skill.²⁵

It is clear that the governor has made comprehensive reform of vocational education a signature priority of his leadership. The reforms he advocates combine dual education with pooling of skill formation, certification, and accreditation based on sectoral and territorial business associations. Lavish press attention to bilateral relations between firms and schools contrasts with the meager coverage of more collective institutions, suggesting perhaps that they are much less robust. Nonetheless, the governor's focused attention to the need to overcome the collective action dilemma in skill formation has enabled the region to accomplish a good deal.

Kaluga and the automotive cluster

Kaluga represents a model of vocational education formation in which regional government regards upgraded skill formation institutions as critical to attracting new

²¹ N.a., "K 2015 godu v regione budet sozdana normativnaia baza dlia vnedreniia chastno-gosudarstvennogo partnerstva v sisteme profobrazovaniia," *Mediatron*, November 13, 2012. < <http://mediatron.ru/node/24045>>

²² In practice it has proven difficult to collect on these loans, see N. Kutkovaia, "U istokov dela-ochen' bol'shogo," *Belgorodskaia pravda*, December 25, 2013. < <http://www.belpravda.ru/news/25.12.13-2889.html> >

²³ O. Goncharenko, "Reforma srednego profobrazovaniia--garantiia razvitiia i modernizatsii," *Belgorodskaia prava*, February 2, 2013 <<http://www.belpravda.ru/?q=node/2076>>

²⁴ <http://rark31.ru/about>

²⁵ < <http://rark31.ru/wp-content/uploads/2014/05/otchet-po-gosadaniyu-1-kvartal-2014.pdf>>

investment. In Kaluga, an entrepreneurial governor initially created a “cluster” development plan designed to take advantage of existing skill formation assets as part of a broader strategy to attract firms to the region. Presented with the opportunity to lure German automaker Volkswagen to the region, the regional authorities immediately adapted the plan to the purpose of serving Volkswagen’s needs. Not only did the regional government encourage conversion of the existing VET Soviet-era system, but, at VW’s behest, it also adopted elements of the German dual education system. These institutions, along with other inducements, helped to seed the ground for a nascent automotive cluster, which culminated in the attraction of other foreign firms. The success of Kaluga’s automotive cluster, in turn, has stimulated efforts to create other clusters in the region. In recent years, Kaluga has become a model for other regions as well. Alone among our regions, Kaluga appears to have taken some steps towards VET reform even before it became an obvious federal priority.

Much of the success of Kaluga’s automotive cluster can be directly attributed to Anatolii Artamonov, who was elected governor of Kaluga in 2000, having become a vice-governor for the region in 1996. He had deep roots in the region, having been born there and made his career in agriculture, construction, and party work. As governor, Artamonov has actively sought foreign investment to the region. As he frequently observes, the region lacks major mineral resources but has an advantageous location on the highway and rail route between Moscow and Kiev. His initial plan for regional development was to take advantage of the concentration of scientists and skilled workers in and around the nuclear physics research institute in the town of Obninsk to create high-technology industrial parks with a comparative advantage in skilled labor. The region’s 2006 strategic plan called for the creation of spin-off industries in and around Obninsk. However, at the same time, the German firm Volkswagen began considering Kaluga as a possible site for a greenfield auto assembly plant. Volkswagen had been searching for a suitable location in Russia and visited several places, including the town of Stupino (near Moscow), where a few foreign companies had already established production facilities. Artamonov was quick to begin courting VW for Kaluga, however.

As a condition for VW investment, Governor Artamonov promised full infra-structural support. Part of this related to the physical plant. He designated a tract of land near the city for the greenfield operation and committed the oblast government to build all communications, utilities and transportation infrastructure to the plant and to build housing for employees. Another had to do with insuring an adequate supply of skills for the firm. The regional government did so by converting an existing vocational school into a training center for employees. The oblast appropriated 30 million rubles of its own money, together with another 25 million in federal funds to create the training center (the governor later said he spent one billion rubles altogether).²⁶ VW in turn committed itself to pay stipends for students and supplements for instructors, to set the curriculum, donate equipment, and issue certificates to the graduates.²⁷ The agreement thus adapted German dual education to suit VW’s interests. At the Kaluga center, as in Germany, about half of a

²⁶ Artamonov speech at State Council, December 23, 2013. <
<http://www.admoblkaluga.ru/sub/governor/speech.php?idsp=49>>
accessed June 27, 2014.

²⁷ Streeck 1984.

trainee's instructional time is spent at the training center, learning on mock-ups of the equipment used at the plant, and the other half at the plant itself under the tutelage of trained master instructors. Meantime, the firm pays the trainee a stipend. Upon graduation, the trainee receives both a diploma and a certification of their skill, as well as a guaranteed job in his or her specialty.

Although Volkswagen's proposed investment in the region provided the immediate impetus for developing a dual education system suited to the automotive industry, federal target funding designed to stimulate the creation of regional training centers preceded it. The federal government announced a competition for co-financing of branch-specific training centers in 2006, and Kaluga was one of the first regions to apply.²⁸ Kaluga submitted its application within a month of the competition's announcement and before VW made its decision to locate its assembly facilities in Kaluga. While it is clear that Artamonov took advantage of the opportunity to leverage federal funding for a reform that corresponded to his own ambition to stimulate territorial industrial clusters, it is also likely that this application was made as an additional inducement for VW. While VW would still have to contribute, applying for federal funds signaled commitment on the part of Kaluga that it would spend what was required to secure VW's investment.

Ultimately, VW chose Kaluga over Stupino for several reasons. On the logistics side Stupino's infrastructure was underdeveloped and overloaded.²⁹ Although Stupino was closer to Moscow, which improved logistics, Kaluga was not so much farther as to pose a significant hurdle. Moreover, regional officials were young, competent, and Western-oriented and more than willing to offer inducements, such as an appealing land tract designed for an industrial plant. VW officials also noted a high educational level among the population. Volkswagen also made it clear that Kaluga was chosen because of the willingness of the regional government to work closely with the company and accommodate its needs.³⁰ Finally, and crucially for the company, there was no existing automotive industry.³¹

Kaluga's automotive industry cluster emerged when other auto firms – including Peugeot-Citroen and later Volvo Trucks, Mitsubishi Motors, and components firms such as Benteler – followed Volkswagen's example and invested in manufacturing facilities in Kaluga. In response to this, the training center there added new instructional modules in 2010 and 2012, and increased the number of firms that contracted with it for training. The expansion of the cluster in turn allowed the training center to expand its intake of students and increase the number of occupational skills it trains for while achieving economies of skill. As with VW's arrangement, the firms contract with the training center to provide training for specific jobs in exchange for financial and technical support. Later, at VW's instigation, the dual education system was adopted by the local affiliate of the Bauman polytechnic institute for higher vocational education for a degree program in "mechatronics."

²⁸ <http://proftech.ntf.ru/node/97>

²⁹ VW executives noted that the local utilities companies could not consistently supply heating and electric power in Stupino during the winter of 2006.

³⁰ Leonid Bekasov, "Pochemu 'Fol'ksvagen' vybral Kalugu?" *Vest'*, June 10, 2006.

³¹ VW prefers not to have to deal with already-established networks of ties between auto industry and local officials.

Encouraged by the success of the automotive cluster, Artamonov then began creating other territorial industrial clusters. The regional government also began pursuing a general policy of reforming vocational education by merging some vocational schools, tying others to local firms, and converting still others to serve as training centers for the agricultural, pharmaceuticals, and construction industries.³² Kaluga became a nationally-recognized leader in the implementation of dual education. For example, along with Sverdlovsk oblast', it was named one of two "mentor-regions" in a project launched by ASI in 2013 to disseminate dual education nationally.³³ Kaluga also returned to Governor Artamonov's original idea of creating an industrial cluster around the Obninsk nuclear research institute by forming a pharmaceuticals industry tied to nuclear medicine.³⁴

Taken together, Kaluga's vocational education system reflects high involvement by government as well as by firms. By encouraging schools to partner with multiple firms, Kaluga employs both a collectivist and a dual education model of VET. The regional government effectively turned the training centers into central clearing houses of skill. Firms had to jointly agree on definitions of specialties and the content of new modules to be taught at the school, as well as endorse certification. Much as in Thelen's (2004) classic definition of collectivism, this created pools of labor "to which all firms contribute and from which all firms can draw." Serving to help enforce the institutional commitments made by firms and government is the continuous effort by the regional authorities to obtain federal funding and federal recognition. Likewise, the foreign investors oversee the system and help guarantee that it serves their needs.

Also important for our purposes is the fact that the region actively promotes its development strategy within Russia. Governor Artamonov has identified himself strongly with the cluster model of development generally and, in particular, with training centers and the dual education system as an institutional solution to the problem of matching skill supply and demand. Kaluga regularly competes in and wins federal competitions for strategic planning, vocational education, innovative development, housing, anti-crisis programs. It also invites governors from other regions, such as Tatarstan and Primorsk, as well as federal ministers to visit the training center and production facilities. Artamonov actively participates in working groups of the Russian State Council on industrial planning as well as German-Russian foreign trade council events. Artamonov also often appears at national forums to call attention to the need to upgrade training as part of the overall need to improve labor productivity in the country.³⁵ His efforts have born fruit, as other major regions such as Tatarstan and Primorsk have created their own training centers along the lines of Kaluga's. Evidently, for the governor, federal recognition of the success of his region in pursuing a strategy for reform that has become a national model is a worthwhile pursuit. While we cannot be certain that it ever made a difference in his reappointment, his

³² "V Kaluge prokhodit I oblastnoi kadrovyy forum," FK-Novosti, March 22, 2012; Kaluga24.TV, "Sistemu profobrazovaniia Kaluzhskoi oblasti moderniziruiut k 2020 godu," May 12, 2014. <<http://dlib.eastview.com/browse/doc/26800565>>

³³ <http://www.asi.ru/news/14773/?sphrase_id=777707>
December 30, 2013.

³⁴ Sergei Korotkov, "Farmklasteru nuzhen master," *Vest'* (kaluga), Nov. 7, 2014.

³⁵ http://www.admoblkaluga.ru/sub/econom/Gos_prog_razv/Strategy/

desire to associate himself closely with VET initiatives at the federal level does indicate that he considers it politically advantageous.

Meantime, the original training center for the automotive industry has continued to expand, adding new modules. For example, in 2012 it added instructional units for painting, conveyer assembly, technical service, quality control, and logistics. It trains employees for many firms in the region, not just Volkswagen and Peugeot-Citroen, including employees for industries related to the automotive sector, such as component suppliers, and for firms outside industry. All told, the center now trains over 30 occupational specialties. The regional government for its part actively promotes the center as a major asset for other foreign investors considering Kaluga. In particular, the government emphasizes that it uses a modified form of the German dual education system, under which students have guaranteed stipends while training, guaranteed jobs upon graduation, and the opportunity to receive three graduation documents--a diploma, a certificate from the enterprise, and a certificate from the Russian-German trade council.³⁶

Perm' krai: "turnkey training"

Kaluga in many ways is the exception that proves the rule of the importance of regional authorities to VET reform in Russia. As far as we are aware, Kaluga is the only region in Russia where a regional business association, in this case the regional branch of the Trade-Industrial Chamber (PTPP), was the lynchpin of VET reform. In 2012, a year after the federal government had begun pushing regions to promote firm-school cooperation in reforming VET, the association developed a plan for German-style dual education called "turnkey training" ("*rabochie kadry 'pod kliuch'*"). This plan was developed after a delegation from the Perm' TPP visited its German sister-city Duisberg and met with its regional chamber of commerce and industry, noting that Germany's regional chamber devoted most of its efforts to coordinating VET amongst its members.³⁷ Adapting from the German model, the TPP has set up a regional program that is heavily advertised by its regional government, which touts the fact that President Putin has praised it and its ability to win federal grant competitions to fund it.

The Perm' TPP sees its role as coordinating the efforts of the regional government ministries, the regional governor, firms, and schools. At the most basic level, the TPP initially surveyed about 850 of the regions 15,000 firms in order to draw up a region-wide order (*zakaz*) for specialists. The regional government then releases this information and allows schools to bid for contracts to train individuals according to the order. To provide incentives, the government provides "certificates" to schools which serve as basis for financing training (ie the funding goes with the student) and ensure that skill outputs meet the requirements of the real economy. As of the 2013-14 academic year, the system encompassed about a third of the students in the secondary-level vocational education

³⁶ <http://www.investkaluga.com/rukovodstvo/sotrudniki-i-sotsialnaya-bezopasnost/poisk-personala/> <<accessed June 29, 2014>>

³⁷ Artem Kovalenko, "Ne tot eshche kadr," *Ekspert Ural*, May 19, 2014, <<http://q99.it/Zo6KlJohhttp://expert.ru/ural/2014/21/ne-tot-esche-kadr/>>

institutions. The institutionally complex nature of the arrangement is reflected in both in its collectivist nature and the use of dual education.

Currently the TPP is also actively encouraging a cluster approach to development by matching territorial concentrations of industry to schools and transforming and extending old primary and secondary vocational schools into training and resource centers. It is also encouraging firms to fund and equip these centers, for example convincing the major oil firm Lukoil to donate equipment for four training wells for oil industry specialists. The TPP is also working with the city Krasnokamsk to develop a machine-building cluster comprising the Krasnokamsk repair-mechanical factory, the German firm DVG, and the Krasnokamsk pulp-paper specialized secondary vocational school, with DVG donating the equipment to the training center.³⁸ When local aviation-engine maker Perm' Motor Works won a large order in 2014 to build 156 engines for Ilyushin-76 military transport planes, it worked out a plan with TPP for training and retraining at a new multi-functional center for applied skills.³⁹ In 2013 Governor Basargin oversaw the formation of a new instructional center for fiber optics technology in cooperation with Lukoil and a local instrument-making company.⁴⁰

In the case of Perm', the business association used information and persuasion to encourage regional-level coordination and overcome the collective action problem inherent in skill formation and in attempts by individual firms to reform it. It was actively encouraged in doing so by federal policy. While the press reports do not indicate the nature of coordination between the regional government and the TPP in creating the program, it is clear that the program enjoyed, at the very least, tacit support from the regional government, and the support may have been much more active. Certainly the timing of the initiative suggests that it was a response to federal incentive programs intended to encourage the kind of firm-school cooperation that Perm' developed. Moreover, it is likely that the TPP's efforts built on existing ties among firms and between firms and government in Perm'.⁴¹ Perm', through its business association, was therefore able to position the regional government to respond to the federal initiative in 2011 to undertake a comprehensive reform of vocational education.

As in Kaluga, Perm''s governor, Viktor Basargin, has championed the dual education model both inside the region and nationally. He met, for example, with President Putin in Moscow to describe the program and to invite federal education ministry officials to come and observe it. In 2014, the regional government won a competition sponsored by ASI for regional programs in dual education serving the needs of high-tech industries, and was designated one of the pilot regions to carry it out. Whatever material benefit federal

³⁸ <<http://www.myshared.ru/slide/627633/>>

³⁹ <[⁴⁰ Inessa Suvorova, "Tochechnoe obrazovanie," *Rossiiskaia gazeta*, April 30, 2014.](http://permtpp.ru/news/projects/ptpp_pomozhet_podgotovit_kadry_dlya_permского_motornogo_zavoda-_/></p></div><div data-bbox=)

⁴¹ Perm's unusually consensual elite culture has often been noted by Russian social scientists. For example, N. Iu. Lapina and A. Chirikova, *Strategii regional'nykh elit: ekonomika, modeli vlasti, politicheskii vybor*. (Moscow: Institut nauchnoi informatsii po obshchestvennym naukam, 2000); N. Iu. Lapina and A. E. Chirikova, *Regiony-Lidery: Ekonomika i politicheskaiia dinamika*. (Moscow: Izdatel'stvo Instituta sotsiologii RAN, 2002).

funding supplied, the recognition that Perm' was a leader in a federally-supported initiative undoubtedly helped to consolidate the governor's own standing at home and in Moscow.

Nizhnii Novgorod: "the beautiful country of vo-tech"

In Nizhnii, much of the impetus for institutionally-intensive solutions to skill upgrading was rooted in increased demand for military production. Between 2008 and 2013, Russia's military procurement spending doubled, providing a substantial stimulus for skill upgrading in regions with a large Soviet-era defense industry, such as Nizhnii.⁴² In order to scale up production, the region needed to quickly train skilled workers. As in Belgorod, Kaluga, and Perm', therefore, reform of the vocational education system responded to a federal government impetus. Indeed, nationally, much of the new federal spending on defense since 2011 has gone to new training resource centers to support the expansion of production lines and raise productivity. The federal funds were deployed to seed new centers that would then subsequently be financed jointly by the regional government and firms. According to the local press, two new resource centers are being built each year.⁴³

Prior to the creation of the regional resource centers, little had been done in the region. In Nizhnii, as elsewhere, firms, schools and government all recognized that the misallocation of skill was becoming acute as the economy recovered in the 2000s. Firms complained about the quality of graduates of schools and the amount of effort they had to put into training. For their part, school officials complained that private sector firms did not want to invest in training and that enterprises were not doing enough to make manual labor attractive (for example, they abandoned social benefits such as worker dormitories). Schools also complained that firms were creating their own training centers rather than working with the existing schools to upgrade training facilities. Experts noted that there was a basic organizational problem: primary-level general educational schools were under municipal government jurisdiction, vocational schools under oblast' jurisdiction, and firms were private. Coordinating across all of these authorities proved difficult. They pointed out that it is inconvenient and expensive for young people from outside the capital city to come in for training.

Gradually, however, and especially since 2007, closer bilateral ties between firms and schools have been forming as have collective resources such as the training centers mentioned above. In part, this was due to pressure from the oblast government on firms and employees, which in 2007 won federal funding in a grant competition to upgrade vocational schools into resource centers. In the initial phase, the federal government contributed half the funding and the rest was split equally between firms and the regional government. Since the first six centers were created, half the funding comes from the regional budget, and the rest comes from firms. The regional government has typically sought to locate its converted resource centers near existing manufacturing sites, for example a training center for the chemical industry was situated close to a large chemical

⁴² Igor' Stanovov, "Oboronka pomozhet nashei ekonomike ulti ot syr'evoi zavisimosti," *Birzha*, July 23, 2013. About 14% of regional output is from the defense industry; about 16% comes from metallurgy; about 17% from automotive.

⁴³ < <http://minec.government-nnov.ru/?id=31005> >

plant. The region is also planning to expand existing automobile production by developing a new automotive training center near Avto-GAZ and using it to attract foreign automotive firms (it has targeted VW and Daimler-Benz). It is also taking advantage of the large increases in federal defense spending to build new training and resource centers around defense industry facilities.⁴⁴ In addition, in order to promote a more appealing image for manual labor, the regional government agreed to fund the production of a 20-episode series of television shows called "the beautiful country of vo-tech" (*prekrasnaia strana prof-tekha*).

The regional government has incorporated the training centers into its long-term (2006-2020) strategic plan for economic and social development, which it submitted to a recent federal competition. A key component of the plan is to develop industrial clusters to take advantage of complementarities among firms and between firms and vocational education institutions. The governor also created a coordinating council on human resources management for the region, which meets twice a year. Its role is to forecast the demand for skill on the labor market to ensure that the training facilities will meet anticipated needs.

Regional business associations have played a support role. The regional TPP holds an annual career fair. The NAPP (the regional branch of the RSPP), in cooperation with the regional ministry of education, drafted a plan for the development of vocational education, but it consists entirely of creating a monitoring service to assess the needs of the labor market for specific job specialties so that the regional government can draw up annual orders for training by vocational schools. The association makes an effort to convince firms to invest resources and effort into the training centers and has also helped to convert two local primary vocational schools into training centers. Thus, although there is some collectivism introduced through the activities of these associations, in general much of the coordination occurs at other levels.

As elsewhere, more collectivist institutional forms exist alongside more segmentalist ones. As elsewhere, vocational schools seek firms as sponsors and sign individual contracts with them for training. They have developed new organizational forms and opened new training programs to meet market demand. Some of the more enterprising schools have made it a point to bring in employers to administer graduation exams and advise on curriculum. These reflect efforts to adapt traditional Soviet practices to new market-oriented conditions.

Most recently, Nizhnii Novgorod has embraced the federal push for dual education. Like his counterparts in Belgorod and Perm', the governor has been promoting it explicitly. Nizhnii Novgorod was one of the ten regions winning the ASI contest in 2014 to implement the dual education model (Kaluga and Perm' were two of the others).⁴⁵ Its experience in upgrading skill formation through close cooperation between schools and firms enabled it to become a national leader in the federal effort to use dual education programs to modernize industry. As in Kaluga and Perm', therefore, Nizhnii Novgorod features both cross-firm collectivist arrangements using resource centers and cluster-oriented development as well as intensive school-firm cooperation through dual education.

⁴⁴<<http://proxylibrary.hse.ru:2067/artefact3/ia/ia5.aspx?lv=6&si=DiKnek2R&qu=2212&st=0&bi=32&xi=&nd=52&tnd=0&srt=0&f=0>>

⁴⁵ <<http://www.asi.ru/news/15749>>

VII. Conclusions

In all four regions, reform of vocational education occurred by renovating traditional Soviet-era institutions featuring strong ties between individual firms and individual schools. In all four cases, the regions combined intensive firm-school relations along the lines of German dual education with collectivist efforts to pool resources for multiple firms, through training centers that provide firms with workers and specialists possessing the qualifications demanded, or devising ways to aggregate orders for training and to certify skills of graduates. All four regions have actively exploited opportunities to win federal funding and recognition for their efforts. These regions are leaders in forging new and institutionally demanding institutional solutions to skill formation problems. Of course we recognize that while they may be representative of regions that have moved furthest in reforming their VET systems, they are not typical of most regions. Still, there are some common themes in the case histories traced here.

Note that in all four cases, major reform followed federal initiatives intended to encourage reforms of the kind they pursued. In Kaluga and Belgorod the initiative occurred more or less concurrently with the promise of federal funding for reform, which enabled the regional government to meet the needs of a foreign firm (VW in Kaluga) and a domestic firm (Agro-Belgor'e in Belgorod) for training. In both cases, entrepreneurial regional governments built complex institutional agreements among firms, schools, and regional and federal authorities. In Kaluga and Belgorod, the region's early success positioned it to take advantage of subsequent federal grants competitions. In Nizhnii Novgorod, the region's early success in winning federal co-funding for new training centers positioned it to win federal contracts for defense procurement, which in turn brought funding for new training centers. In Perm', the regional business association cooperated with the regional government in acquiring federal funds to complement regional government and firm funds for new German-style dual education programs. Thus in all four regions, the federal target program for education created incentives to build resource centers or develop dual education programs that played a catalytic role in facilitating cooperation among firms and between firms and government. Existing ties in business association and traditions of local corporatist cooperation between major employers and government served as the foundation for the new arrangements. But the arrangements themselves took form only in response to opportunities to pursue federal funding and recognition.

Second, labor has played a negligible role in the reform of VET. In our review of many hundreds of press articles, conference proceedings, and official documents, trade unions were conspicuous by their absence. The lengthy Belgorod plan, for example, mentions a number of business and public associations as participants--but never mentions labor unions. Bargaining between labor and employer associations is never the basis for VET reform, although employer associations routinely discuss the issue with government. Contributing to the financing or organization of skill formation is simply not part of the landscape of trade union activity. Russia has a formal tripartite structure for bargaining among labor, employers and government over wages and employment conditions, but it is formalistic and tends to concentrate on minimum standards. Training, when it is treated in the context of such agreements, usually is tied to guarantees of retraining and job

placement in case of layoffs. To the extent that corporatist forms of decision-making play a role, they are bilateral bargaining between business associations and government.

Third, each arrangement was vulnerable to free-riding and shirking. Recall that resource centers are often no more than renamed vocational schools. Without mechanisms to enforce compliance with agreements, they can readily become pro forma. Indeed, we strongly suspect that some of the successful examples of new institutional arrangements cited here and drawn from published reports may amount to much less in substance than they appear to be on paper, or fell into disuse after the first year or two. A striking example is the “monitoring group for realization of regional programs of modernization of the system of vocational education” created in 2011 by President Medvedev. It focused on oversight of regional reform plans and the new cross-regional branch resource centers. It sponsored a number of events in 2012 and 2013, then ceased active existence. Its website is still active (proftech.ntf.ru) but the last events the site lists are in 2013, and its phones have been disconnected. Perhaps its activity has been taken over by ASI. In that context, it is worth recalling that the “monitoring group” was an initiative of President Medvedev, whereas ASI was created by Putin.

Nevertheless, we believe that several factors reduce opportunities for shirking. One is the continued high level of federal attention to the system of vocational education, as indicated for example, by the government’s directive of March 2015. ASI’s continuing use of contests--including promotion of regional WorldSkills competitions--encourages regions to showcase their successes. Note that ASI involves German manufacturers in the judging, which helps explain the strong pressure for dual education. Perhaps most salient is the large-scale and continuing modernization of military technology. This encourages regions to adapt local production and VET institutions so as to be competitive for procurement orders.

We conclude, therefore, that while the impetus to reform may in some cases reflect foreign investors’ interests, and in other instances local policy entrepreneurship by regional business firms, business associations, and governments, the federal government’s role in pressing for and materially encouraging reform is by far the strongest force shaping the evolution of VET reform. It does so not by mandate, but by using federal attention and federal co-funding as a device to ensure fulfillment of commitments to institutional change on the part of regional governments, schools, and firms. In outlining our conception of state-initiated coordination, we emphasize the relationship between federal and regional government actors in overcoming the collective dilemmas associated with skill formation. Given the legacy of a state socialist system, with underdeveloped employer and labor associations, and state domination over society, it is hard to imagine how institutionally-complex reform could arise except through the state’s initiative.

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