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Iron Deficiency and the Well-being of Older Adults: Early Results From a Randomized Nutrition Intervention

DUNCAN THOMAS, ELIZABETH FRANKENBERG, JED FRIEDMAN, ET AL.

There is a strong positive association between health and economic prosperity. Thinking of health as one dimension of human capital, it is plausible that improvements in health will yield returns in the labor force. If a healthier worker is less susceptible to disease, is more alert and has more energy, then he or she will probably be a more productive worker and command higher hourly earnings.

Iron deficiency is the most common nutritional deficiency in the world today. It is estimated that over 2 billion people worldwide are iron deficient. The effects of iron deficiency include reduced immune response, delayed cognitive and physical development, fatigue and reduced work capacity and, in extreme situations, death.

“... over 2 billion people worldwide are iron deficient.”

In Iron Deficiency and the Well-being of Older Adults: Early Results From a Randomized Nutrition Intervention, Thomas and his co-researchers provide new evidence on the effect of iron deficiency on economic and social prosperity of older adults drawing on data from a random assignment treatment-control design intervention that they designed and implemented.

The Work and Iron Status Evaluation is an on-going study following over 17,000 individuals in Central Java, Indonesia. Half the respondents receive a treatment of 120 mg of iron every week for a year; the controls receive a placebo. Compliance is monitored carefully. Results from the first six months of the intervention are presented for adults age 30 through 70 years.

The authors find that males who were iron deficient prior to the intervention and who were assigned to the treatment were better off in terms of physical health, psycho-social health and economic success. These men are more likely to be working, sleep less, lose less work time to illness, are more energetic, more able to conduct physically arduous activities and their psycho-social health is better. There is evidence that economic productivity of these males also increased. Among iron-deficient males assigned to the treatment who were also self-employed prior to the baseline, hourly earnings were substantially higher than comparable men who did not receive the treatment.

The effects for females are generally in the same direction but tend to be more muted. Treated females who were iron deficient at baseline are more likely to be working, have higher hourly earnings if they earn income and tend to have better physical and psycho-social health. The results provide unambiguous evidence in support of the hypothesis that health has a causal effect on economic and social prosperity of adults during middle and older ages.

While iron deficiency is very rare in the developed world, in part because iron fortified cereals are commonplace, iron deficient anemia is widespread in many parts of the developing world. Prevalence is particularly high in those areas where rice is the main staple, since rice retards iron absorption, and where animal protein is not an important component in the diet, since iron from

*“...children
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animal sources is better absorbed than from vegetable sources. While iron supplementation through provision of tablets is standard practice throughout the world for pregnant women and, in some places, for young children, it is not common for males to receive iron supplements. Distribution of iron through tablets is likely to be an expensive means of reducing iron deficiency in many low-income settings. However, several recent studies have demonstrated that it is feasible to reduce iron deficiency in populations at very low cost through simple iron-fortification technologies and through nutrition education campaigns. The results of this research suggest that programs which improve the nutritional status of a population are likely to yield significant economic and social benefits. ✧

Remediating Education: Evidence from Two Randomized Experiments in India

**ABHIJIT BANERJEE, SHAWN COLE, ESTHER
DUFLO AND LEIGH LINDEN**

There has been a lot of interest recently in the question of how to effectively deliver education to the poor in developing countries. In *Remediating Education: Evidence from Two Randomized Experiments in India*, authors Abhijit Banerjee, Shawn Cole, Esther Duflo and Leigh Linden present the results of a two-year randomized evaluation of a large-scale remedial education program conducted in Mumbai and Vadodara, India. The remedial education program hires young women from the community to teach basic literacy and numeracy skills to children who reach India's school standard Three or Four without having mastered these competencies. The program, implemented by a NGO in collaboration with the government, is extremely cheap, approximately \$5USD per child per year, and is easily replicable. It has been implemented in 20 Indian cities and reached tens of thousands of children.

The authors find the program to be very effective. On average, it increased learning by 0.15 standard deviations in the first year, and 0.25 in the second year. The gains are the largest for children at the bottom third of the distribution, who gained 0.2 standard deviations in the first year, and 0.32 in the second year. In math, chil-

dren in the lower third gained 0.51 standard deviation in the second year. The results are similar in the two grade levels and in the two cities.

The intervention was motivated by the belief that children often drop out because they fall behind and feel lost in class. The program provides remedial education, in small groups, to children that are lagging behind. To keep costs low and ensure a good instructor-student relationship, the program hires young women (“Balsakhis”) who have the equivalent of a high school degree from the local slum communities in which the schools are located.

Because the study was a randomized evaluation, the authors feel confident there are no confounding factors. Since the program involved more than 15,000 students and had already demonstrated the ability to scale up in other cities, the authors believe the project can easily be reproduced elsewhere. Also, since the study was simultaneously carried out in two different cities, each of which had its own management team, the authors have confidence in the external validity of their results. Finally, since the study was conducted over a two year period, using several tests, it is less likely that the results are a consequence of the newness of the program or the effect of implementing an evaluation.

The impact of the program was remarkably stable across years and cities, especially when one considers the instability of the environment; there was a major riot and a catastrophic earthquake while the program was running. Moreover, the weaker students, who are the primary target of the program, gained the most. This study demonstrates both the efficacy of the remedial education program, and more generally, the feasibility of dramatically impacting test scores at very low cost. The authors make an attempt to distinguish the direct effect of the program (on children who worked with the balsakhi) and the indirect effects (on those who did not). The estimates suggest that reducing class size by hiring a balsakhi is at least twice as effective as reducing class size by keeping children with regular teachers.

While the exact details vary according to local conditions, the typical instructor meets with a group of approximately 15-20 children in the morning for two hours, and with another group of the same size in the afternoon. Instruction focuses on the core competencies the children should have learned in the second and third

standards, primarily basic numeracy and literacy skills. The instructors are provided with a standardized curriculum that was developed by the NGO. They receive two weeks of training at the beginning of the year and ongoing reinforcement while school is in session.

An important characteristic of this program is the ease with which it can be scaled up. Because the NGO relies on local personnel, trained for a short period of time, the program is very low-cost, each teacher being paid 500-750 rupees, or \$10-15 USD per month. There is rapid turnover among the balsakhis, indicating that the success of the program does not depend on a handful of very determined and enthusiastic individuals. Also, since the balsakhis use whatever space is available, even hallways when necessary, the program has very low overhead and capital costs. At the margin, extending this program would be up to 12-16 times more cost effective than hiring new teachers. ✧

Ethnicity, Gender, and the Demand for Public Goods: Experimental Evidence from Benin

LEONARD WANTCHEKON

There is a growing consensus among economists and political scientists that excessive and inefficient redistribution leading to under provision of public goods is one of the prime causes of underdevelopment. The literature has focused almost exclusively on the economic and political determinants of public goods supply, such as income inequality, low productivity, ethnic divisions and proportional electoral systems. Very little attention has been paid to the determinants of the demand for public goods. The standard assumption in the literature is that, in the presence of ethnic divisions, voters have weak preferences for public goods.

Yet, demand for public goods may crucially depend on features of the political process. It may also depend on the extent to which promises of public goods provision by politicians are credible. For instance, assuming that ethnic ties enhance credibility of campaign promises, a given voter might support a public goods platform if such a platform were adopted by a candidate from his or her ethnic group.

In *Ethnicity, Gender and the Demand for Public Goods: Experimental Evidence from Benin*, author Leonard Wantchekon provides experimental estimates of the effect of ethnic ties between voters and candidates on the demand for public goods and redistribution. In contrast with previous studies that focus on the effect of ethnic diversity on public goods provision, the authors use a more micro-political approach to ethnicity by investigating the following questions: Would voters punish a candidate from their own ethnic group if that candidate were to adopt a national public goods platform that appeals equally to voters from all ethnic groups? Alternatively, would voters from a given region punish a candidate not from their ethnic group if that candidate were to adopt a redistributive platform, stressing the needs of that region?

To address these questions, the author conducted a randomized field experiment in the Republic of Benin, located in West Africa between Togo and Nigeria. The majority of the country's population of 6,200,000 falls within four major ethno-linguistic groups. In collaboration with four political parties involved in the 2001 presidential elections, 'purely' distributive platforms and 'purely' national public goods platforms were designed and presented in twenty villages. The project included the incumbent president and his predecessor, the current vice president of the National Assembly and the current minister of planning. Each village contained an average of 756 registered voters. Using post-election data, the author compared the voting behavior in villages exposed to the experimental platforms (treatment groups) with that in the other villages (control groups).

The author finds that ethnic ties tend to strengthen voters' support for public goods platforms, with the effect being particularly strong among women. Surprisingly, voters from ethnic groups other than that of the candidate tend to reject his broad-based public goods appeals while those from ethnic groups tend to embrace it. There is, however, no significant difference across ethnic groups in their response to redistributive platforms. The results indicate that ethnic voting and ethnic diversity might be compatible with preference for public goods. They also suggest that ethnic ties can help secure electoral support for nation-building policies, so long as such policies are adopted by political leaders.

"... ethnic ties tend to strengthen voters' support for public goods platforms."

“... when stock brokers trade on their own behalf, they earn annual rates of return that are 50-90 percentage points higher than those earned by outside investors.”

Finally, the author extends the typical randomized experimental design to the analysis of voting behavior and the evaluation of political platforms. It provides ways to ensure the external and internal validity of such an experiment without affecting the integrity of the election. For example, electoral districts were stratified according to key political characteristics (e.g. incumbent versus opposition districts, northern versus southern districts) and experimental platforms or treatments were restricted to “strongholds”, (i.e. districts dominated by one candidate). In addition, the two types of treatments (public goods and redistribution) have opposing effects and were applied in relatively distant villages. ✧

Unchecked Intermediaries: Price Manipulation in an Emerging Stock Market

ASIM IJAZ KHWAJA, ATIF MIAN

Just how costly is poor governance of market intermediaries? In *Unchecked Intermediaries: Price Manipulation in an Emerging Stock Market*, authors Asim Ijaz Khwaja and Atif Mian use unique trade level data from the stock market in Pakistan to answer that question. They find that when stock brokers trade on their own behalf, they earn annual rates of return that are 50-90 percentage points higher than those earned by outside investors. Neither market timing nor liquidity provision by brokers can explain this profitability differential.

The authors uncover unusual trading patterns for brokers trading on their own behalf, a practice that leads to brokers making large returns at the expense of outside investors and that creates systematic profitability differences. While market timing and liquidity-based explanations could account for some of the results, the authors' evidence indicates manipulation of stock prices by collusive brokers as the dominant explanation.

The evidence points to a specific, trade-based 'pump-and-dump' price manipulation scheme: when prices are low, colluding brokers trade among themselves to artificially raise prices and attract positive-feedback traders. Once prices have risen, the brokers exit, leaving the outside investors to suffer the ensuing price fall. Conservative estimates suggest these manipulations can account for almost one-half of total broker earnings. These large differentials may explain why

emerging equity markets often remain marginal with few outsiders investing and little capital raised.

The authors also estimate how significant these manipulation-based differentials are, particularly in relation to what brokers earn by honestly representing outside investors. Making assumptions about trading behavior and brokerage commissions, the authors compute a broker's total manipulation and honest trading earnings. They conservatively estimate that manipulation differentials comprise a significant part of the overall market - 44% of total broker earnings in the market.

The authors also examine the earnings from honest and manipulative activity for each broker. They find that most brokers earn significant manipulation differentials. This implies that rather than try and focus only on a few brokers, regulation must correct for the broad presence and extent of manipulation in general.

The authors believe that in terms of direct costs the large transfer of wealth from outsiders to insider manipulators is likely to significantly discourage how much and how many outside investors choose to invest in the market. The presence of manipulators and naive traders imposes large participation costs for rational and sophisticated agents trying to either invest or raise capital in equity markets. These costs may help explain financial under-development in these countries, as well as their excessive market volatility. The authors also point out that while their results do not imply that financial markets have little to contribute to growth in developing economies, simply observing an active market should not automatically lead one to conclude that such a role is being played.

The authors discuss possible reform measures, such as greater presence of independent members (non-brokers) in the exchange's board of directors; facilitating entry and competition amongst brokers including the setting up of new exchanges; better systems of surveillance; tighter enforcement of existing and new regulation, such as stricter margin/capital adequacy; and information disclosure requirements, that protect outside investors and prevent undesirable activities in the market. As to the question of why countries fail to adopt and implement good governance and other laws needed to strengthen their equity markets, the authors note that in Pakistan such efforts have met with strong political opposition by lobbies working on the brokers' behalf.

The manipulative activities identified by the authors are likely to occur in newer and shallower emerging markets. They can be responsible for limiting the depth and size of such markets, leaving them in “infancy traps” in the absence of positive reform. The result is that equity markets, whose job is to facilitate real economic activity, may remain as phantom markets that serve little economic purpose. ✧

Risk, Network Quality, and Family Structure: Child Fostering Decisions in Burkina Faso

RICHARD AKRESH

In sub-Saharan Africa, child fostering is a prevalent and socially accepted institution where parents send their own biological children to live with another family. In rural Burkina Faso, approximately twenty-seven percent of households either sent or received a foster child between 1998 and 2000. Almost ten percent of all children aged five to fifteen, inclusive, were sent to live away from their biological parents during this time period. These children spent, on average, two years and nine months living away from their parents.

Living away from their parents might put these children at risk of reduced educational attainment or worse health outcomes, which would further impair Africa’s economic growth and limit its ability to achieve sustainable development. Most international development organizations and academic research claim that these outcomes are widespread and that child fostering is detrimental to children’s welfare. However, several researchers argue there is considerable heterogeneity in the schooling and health outcomes of foster children that varies across countries, wealth classes, and reasons for the child being sent.

Given the prevalence of child fostering and the potential welfare implications for these children living away from their biological parents, it is important to understand why a family adjusts the structure of its household. In *Risk, Network Quality, and Family Structure: Child Fostering Decisions in Burkina Faso*, author Richard Akresh examines why families send and receive children, using data he collected during eighteen months of fieldwork in Burkina Faso. The author presents a theoretical framework, in which children

are efficiently allocated across households in a social network, to motivate three principal factors influencing the household decision to foster a child. First, households use child fostering as a risk-coping mechanism in response to external income shocks. Second, households with better opportunities, measured in terms of the quality of their social network, are more likely to foster. Third, in these households, children perform chores and having too many or too few children in a given gender and age class may not optimize household production. Therefore, parents are more likely to foster children to offset these demographic imbalances.

Increases of one standard deviation in a household’s income shock, percentage of good network members, or number of older girls, would increase the probability of sending a child above the current level of fostering by 28, 20, and 34 percent, respectively.

One implication of the theoretical framework, which is empirically rejected, is that the factors that influence a household’s sending decision should have an opposite effect on the receiving decision. The author finds that while these three factors significantly affect the household’s decision to send a child, they do not explain the decision to receive a child. The only variable that is consistently significant is the receiving household’s wealth, with richer households more likely to receive a child.

The author builds on prior child fostering research by confirming that child labor plays a role in household fostering decisions. The author also extends the risk-coping literature by providing evidence for another mechanism that households adopt to deal with adverse shocks and income fluctuations. Finally, the author extends previous research on social networks by considering their impact on a new outcome, child fostering, and suggesting two new quantitative measures of network quality. ✧

Dynastic Management

FRANCESCO CASELLI AND NICOLA GENNAIOLI

There is broad agreement that differences in aggregate Total Factor Productivity (TFP) constitute a large fraction of the existing cross-country differences in per-capita income.

Not only do poor countries have fewer productive resources, such as physical and human capital, but they also employ those resources less

“In rural Burkina Faso, approximately twenty-seven percent of households either sent or received a foster child between 1998 and 2000.”

“Not only do poor countries have fewer productive resources, such as physical and human capital, but they also employ those resources less effectively than rich countries.”

effectively than rich countries. Researchers have offered potential explanations for these TFP differences, such as lags in technology diffusion, inappropriate technology, ethnic conflict, geography, vested interests and other institutional failures.

In *Dynastic Management*, authors Francesco Caselli and Nicola Gennaioli suggest that the failures of meritocracy are yet another potentially critical source of economic inefficiency that affect TFP. Dynastic management is the inter-generational transmission of control over assets that is typical of family-owned firms. It is pervasive around the world, but especially in developing countries.

The authors present a model of the macroeconomic causes and consequences of dynastic management. In their model, the incidence of dynastic management depends on the severity of asset-market imperfections, on the economy's saving rate, and on the degree of inheritability of talent across generations. Their simulations suggest that dynastic management may be a substantial contributor to observed cross-country differences in productivity, possibly responsible for dampening TFP levels as low to as 80% of countries with well functioning markets.

While there is little economic justification for the fact that many firms are managed by their owners, in reality the ownership of firms is concentrated in few hands, often members of a family. Further, these family-owned firms are often family managed, giving rise to dynastic management. Not only the property of the asset, but also its management, passes on across generations of the same family.

In the authors' model, the frictions that give rise to dynastic management are features of a country's financial and contractual infrastructure. Untalented heirs of family firms would like to transfer control to new talented owners or hire talented managers. However, imperfect financial-contract enforcement discourages ownership changes, and costly monitoring makes it difficult to write managerial contracts. The severity of these impediments to the transfer of control depends on the severity of the asset market imperfections. Cross-country variation in asset market imperfections leads to cross-country variation in the incidence of dynastic management, and of TFP with it.

Numerical simulations of the authors' growth model featuring dynastic management show that the aggregate efficiency costs of this failure of meritocracy may be severe. The model also explores

how the incidence of dynastic management, and of its adverse consequences, varies with the saving rate, and with the inter-generational persistence of talent. In cross-country data, economic performance is clearly positively correlated both with indicators of financial market development and saving rates. According to the authors, dynastic management is a source for these correlations. ✧

Traditional Institutions Meet the Modern World: Caste, Gender and Schooling Choice in a Globalizing Economy

KAIVAN MUNSHI AND MARK ROSENZWEIG

As modernization proceeds around the world, there is a perception that indigenous pre-existing institutions may importantly shape the course of the development process across different countries. Yet little is known about how such institutions actually affect the transformation of economies undergoing change or their impact on the economic mobility of particular groups of individuals. In *Traditional Institutions Meet the Modern World: Caste, Gender and Schooling Choice in a Globalizing Economy*, authors Kaivan Munshi and Mark Rosenzweig examine the role of one long-standing traditional institution - the Indian caste system - in shaping career choices by gender in an economy that is rapidly globalizing. Bombay's labor market was historically organized along rigid caste lines. But there was a dramatic change in the economic returns to different occupations in the 1990s.

The authors find that male working class networks, organized at the level of the sub-caste or *jati*, continue to channel boys into local language (Marathi) schools that lead to traditional occupations, despite the fact that returns to non-traditional, white collar occupations rose substantially during the post-1990s reform period.

In contrast, lower-caste girls, who have had historically low labor-market participation rates and few network ties to constrain them, appear to be taking full advantage of the opportunities that have become available in the new economy by switching rapidly to English instruction schools. It is generally believed that the benefits of globalization have accrued disproportionately to the elites in developing countries. In this setting the authors find instead that girls, a previously

disadvantaged group, might surpass boys in educational attainment and employment outcomes in the future in the most heavily networked *jatis*.

The authors surveyed 4,700 households belonging to the Maharashtrian community and residing in Bombay, India, as well as 28 of the 29 schools in the area. The schools, which run from grades one through ten, were studied over a twenty-year period. English is the language of instruction in ten of the schools, while Marathi is the language of instruction in the remaining 18. The sample of households covered 59 *jatis*.

Although the authors focused on how traditional institutions shape the responses of particular groups of individuals to the new opportunities that accompany globalization, their findings suggest that these institutions are likely to be affected, in turn, by the forces of change. For example, an individual schooled in English no longer appears to need the traditional caste network. Statistics on marriage and migration that the authors computed for the elder siblings of the students in their sample appear to support the view that English education will ultimately undermine the caste network. Among the 792 married siblings in their sample, 11.8% married outside their *jati*. This contrasts with the parent generation in which only 3.6% of the partners were not members of the same *jati*. Schooling in English appears to be contributing to this increase in inter-caste marriage, as 31.7% of the English-educated married outside their *jati* versus only 9.7% of the Marathi-educated. And among the 750 siblings who are currently employed, 41.7% of the English-educated work outside Maharashtra versus only 11.0% of the Marathi-educated.

Both marriage outside the *jati* and out-migration weaken caste ties and the caste network. Increasing exposure to the modern economy through English education, and the mismatch in educational choices and future occupational outcomes between boys and girls in the same *jati*, suggest that the forces of modernization could ultimately lead to the disintegration of a system that has remained firmly in place for thousands of years. ✧

Teacher Incentives

PAUL GLEWWE, NAUMAN ILIAS, AND MICHAEL KREMER

Teacher incentive programs have enjoyed growing popularity worldwide. Ad-

vocates of incentive pay for teachers note that teachers currently face weak incentives, with pay determined almost entirely by educational attainment, training, and experience, rather than performance. They argue that linking teachers' pay to students' performance would increase teacher effort.

Opponents of performance incentives argue that since teachers' tasks are multi-dimensional and only some aspects are measured by test scores, linking compensation to test scores could cause teachers to sacrifice promoting curiosity and creative thinking in order to teach only those skills tested on standardized exams.

In the United States, a number of teacher incentive programs have been introduced in the past decade, generally offering annual merit pay on the order of 10% to 40% of an average teacher's monthly salary. Under the No Child Left Behind act, passed in 2001, poorly performing schools face sanctions across the United States. Israel has provided incentives to teachers based on students' scores and a World Bank program in Mexico will provide performance incentives to primary school teachers.

In *Teacher Incentives*, authors Paul Glewwe, Nauman Ilias, and Michael Kremer examine the issue of teacher incentives in Kenya where existing teacher incentives are weak, with teachers absent from school 20% of the time and absent from their classrooms even more frequently.

The authors report on a randomized evaluation of a program that provided primary school teachers in 50 rural Kenyan schools with incentives based on the average test score of students already enrolled at the start of the program. Each year the program provided prizes valued at up to 43% of typical monthly salary to teachers in grades 4 to 8 based on the performance of the school as a whole on the Kenyan government's district-wide exams. This ratio of prize to salary was similar to that used in typical U.S. incentive programs.

The authors find that students in program schools had higher test scores, significantly so on at least some exams, during the time the program was in place. An examination of the channels through which this effect took place, however, provided little evidence of more teacher effort aimed at increasing long-run learning. Teacher attendance did not improve, homework assignment did not increase, and pedagogy did not change. The authors found that teachers increased efforts to raise short-run test scores by conducting more test preparation sessions. While

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“... the status quo—with its 20% teacher absence rate—is inadequate.”

students in treatment schools scored higher than their counterparts in comparison schools during the life of the program, they did not retain these gains after the end of the program, consistent with the hypothesis that teachers focused on actions that would affect short-run scores.

In order to discourage dropouts, students who did not test were assigned low scores for the purpose of awarding teacher incentives. Program schools had the same dropout rate as comparison schools, but a higher percentage of students in program schools took the test.

All teachers interviewed supported the idea of motivating teachers by providing them with incentives. Most reported a change in school activities and teacher attitudes because of the program. For example, 75% of teachers in program schools reported an increase in homework assignment due to the program. However, the authors found that treatment schools assigned only slightly more homework than comparison schools prior to the program, although the difference was far from significant. After the launch of the program, treatment schools actually assigned slightly less homework, although the gap was again insignificant both in levels and in differences.

The authors acknowledge that a larger incentive program, teacher-specific incentives or a more permanent program might have induced

not only increased test preparation, but also increased effort to improve underlying learning. However, such programs could also lead to efforts to manipulate scores in unintended ways, for example by forcing academically weak students to repeat grades. Whatever the problems with teacher incentives, the status quo—with its 20% teacher absence rate—is inadequate. The authors consider alternatives, including matching incentives to measurable inputs, such as teacher attendance, decentralizing control over teachers to local school committees, allowing parents to choose schools, and tying school finance more tightly to enrollment. ✧

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