LEVERAGING INTERNATIONAL PUBLIC PROCUREMENT IN SUPPORT ECONOMIC DEVELOPMENT: FORECASTING PUBLIC SECTOR EXPENDITURES AND MARKET SIZE IN TURKEY

Travis K. Taylor and Murat A. Yülek*

ABSTRACT. This paper analyzes public sector expenditures in developing countries, and examines the viability of leveraging procurement to meet development objectives. The IMF forecasts a seven percent growth rate of GDP (PPP USD) in 2011 for developing countries, compared to three percent for advanced economies. The robust growth yields tax revenues that fund public expenditures. Developing countries are characterized by inadequate physical infrastructure, which, in turn, negatively affects economic competitiveness. Domestic industry typically lacks the technological and productive capacity to meet the capital demand. Consequently, public procurement of foreign capital machinery and equipment represents a significant share of total government outlays in most countries. We present panel data of 67 developing countries, and also forecasts from our case study country, Turkey, which demonstrate a positive trend in public expenditures, and argue that the rise in public expenditures on foreign capital is likely to be sustained over both the medium and long term due to both push and pull factors. We find that most developing country governments possess sufficient purchasing power to leverage procurement in support of broader economic development goals.

* Travis K. Taylor, Ph.D., is Associate Professor of Economics at Christopher Newport University in Newport News, Virginia, USA. His teaching and research interests are in the fields of contracting and economic development. Murat A. Yülek, Ph.D., is the Vice Rector and Dean of Business Faculty at THK University, Ankara, Turkey. His teaching and research interests are in the fields of economics, development, and finance.

INTRODUCTION

Developing countries are characterized by an insufficient capital stock and inadequate physical infrastructure, which, in turn, negatively affects economic competitiveness. Domestic industry typically lacks the technological and productive capacity to meet the capital demand. Consequently, public procurement of foreign capital machinery and equipment represents a significant share of total government outlays in most countries. Until recently, the subject of public procurement was largely ignored by development economists. Procurement was left to accountants, budget analysts, and operations management specialists with an eye towards ensuring a stable supply chain, minimizing cost, and maximizing a narrow set of objectives.

Public procurement can be defined as the purchase and acquisition of goods and services by a government entity. The types of goods and services procured range from the routine and mundane—pens, staplers, and chairs—to large and high technology—computers , lasers, and nuclear powered aircraft carriers. Domestic public procurement refers to government purchases of goods and services from home country firms. A government practices *international public procurement* when it buys goods and services from foreign firms. To our knowledge, there are no databases that offer cross-sectional and/or time series data of public procurement in developing countries. However, most countries publish data pertaining to government purchases, public sector expenditures, and imports. By noting the relationship among these three variables, we can begin to understand the size of public procurement markets—both domestic and international—among the emerging economies.

In this paper, we study the size of and growth trajectories of public sector expenditures in developing countries. If developing country governments are shown to possess significant purchasing power in imperfectly competitive markets, a menu of traditional and non-traditional procurement contracts that can support economic development become viable. International public procurement, in our view, is an untapped asset for many developing countries that can be

leveraged to foster the creation and nurturing of industry comparative advantage. This view is certainly not new, but it can't be considered mainstream either. The WTO's 1994 (and 2011 update) Agreement on Government Procurement (GPA), for example, discourages or prohibits governments from employing some of these non-traditional contracts. We believe that strict adherence to the GPA effectively "kicks away the ladder" for developing countries by limiting their choice of procurement instrument and forcing neoclassical-style competition. Conversely, a balanced heterodox approach to economic development retains the basic tenets of free market competition, but acknowledges a planning role for governments to address market failures, establish institutions that support long-term growth, and implement policies that influence industrialization, technology, and trade (hereafter, ITT).[1]

The paper is organized as follows. In section 1, we present several stylized facts concerning international public procurement. These facts reveal an untapped asset of significant value based on the government's purchasing power, particularly in world oligopsony markets. In section two, we review the latest literature pertaining to linkages among public procurement, ITT policies, and development. The third section presents projections of Turkish government expenditures in four key sectors. Inferences from these projections can then made to construct estimates for international public procurement in these sectors.   Section four offers concluding remarks.

STYLIZED FACTS OF PUBLIC PROCUREMENT IN DEVELOPING COUNTRIES

1.*The size of public procurement markets in developing countries is substantial and rising*. Public procurement is a subset of a country's public sector expenditures. Public sector expenditures include both current outlays for day-to-day operations and capital investments for the future. The latter is critical for a country's long-term economic development. Among 67 developing countries in 2007, combined public sector expenditures were USD 4.8 trillion (Figure 1), a

significant increase from just over USD 1 trillion in 1985. Please note that the data included in this paper focuses on central government public expenditures, though some overlap from regional and local spending is likely.[2]   On an individual country basis, annual public sector expenditures averaged USD 72.3 billion in 2007. A country's inclusion in the database was dependent upon meeting minimum reporting thresholds.
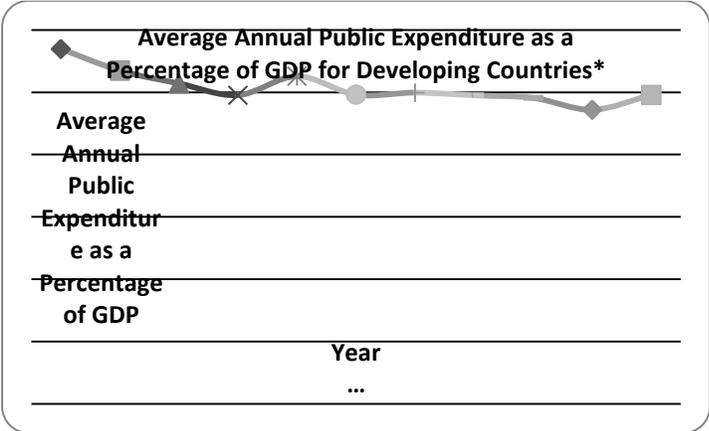
FIGURE 1

Total Public Expenditures for Developing Countries*

Total Public Expenditures (Billions of 2005 International Dollars)

Year ...
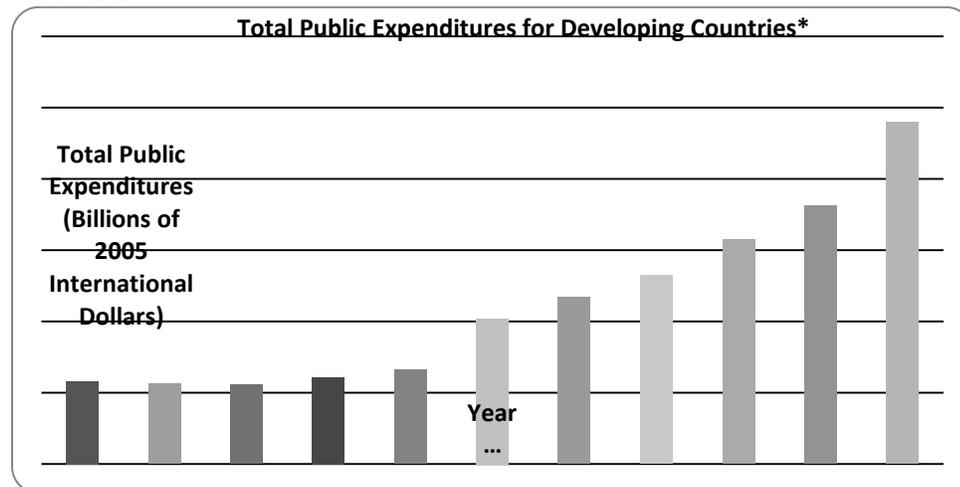
2. *Public procurement accounts for a significant share of a government's annual expenditures and a non-trivial amount of a country's GDP.* Figure 2 demonstrates, public sector shares of GDP have been, on average, remarkably stable over the past 20 years ranging from approximately 28% to 24%.   Maldives had the highest public expenditure to GDP ratio at 61%, while Brazil was the lowest at 3%.[3]

This is consistent with other estimates. Callendar and Mathews (2000), for example, estimate that public procurement expenditures from all levels of government range from 10 to 30 percent of GNP. Yülek (2012) reports that public expenditures of central governments (excluding state and local) have amounted to 4-5 percent of GDP in recent years.

FIGURE 2

Public sector expenditure data for the so-called BRIC countries—Brazil, Russia, India, and China—and our case study country, Turkey, are presented in Figure 3.

FIGURE 3

Total Public Expenditure as a Percentage of GDP
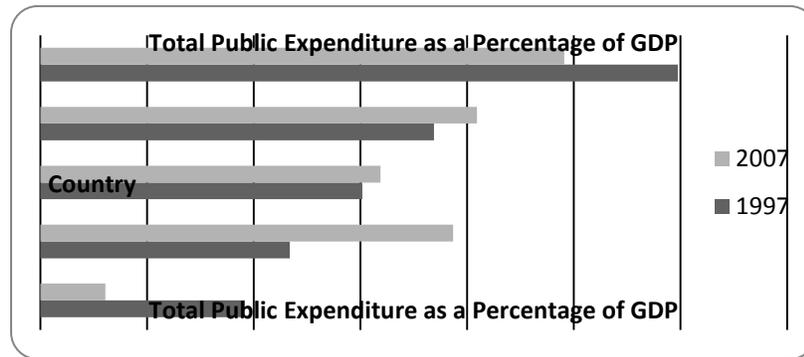
3. *International public procurement represents a significant share of a government's capital expenditures and is critical for economic development purposes.* Many developing countries import intermediate, capital, defense, and high technology goods because domestic industry either does not exist or is not internationally competitive. Imports (private sector plus public sector) for most open, developing economies range from 15 to 35% of GDP. Unfortunately, international public procurement data is not available across countries. Yülek (2012), however, sheds some light on the matter. He estimates central government public procurement of capital imports for Turkey range from 0.5 to 1% of GDP. Based on our review of government budgets and national income accounts, we believe this is a reasonable approximation for open-economy developing countries.

International public procurement in imperfectly competitive markets involve rents that can be extracted by governments to realize long-term development objectives. As Thai (2005, p. 9) notes, "Public procurement practitioners may be in a favorable economic environment or market (with many competing tenderers in their country or local area) or an unfavorable economic environment (where competition hardly exists)." Tirionfetti (2000) evaluates discriminatory procurement policy through the lens of international trade theory. He finds that procurement policy can alter patterns of international specialization in increasing returns industries. The

implications of this finding are significant for a country's long-term economic development.[4] Developing countries small and large can, in select instances, use procurement policy to spur industrialization by increasing market size, fostering scale economies, and reducing units costs via learning-by-doing.   On the other hand, when governments purchase goods and services in competitive markets price will converge towards unit costs over time.   In competitive markets, therefore, government should procure the products at arm's-length exchange and eschew any nonstandard contracts (industrial policy, countertrade, local content, etc.). In short, no rents are to be had, and the marginal benefits of intervening in the marketplace are less than or equal to zero, while the marginal costs are strictly positive. Examples of public procurement in this category include pencils, chairs, soap, paper, food, and similar items.

Imperfectly competitive market exchange typically results in relatively higher product prices, lower quantity, and seller super-normal profits. Rents can be extracted by buyers possessing leverage, purchasing power, and superior negotiation skills.   Rent extraction can take multiple forms: traditional price discounts, but also a myriad of benefits derived from so-called 'nonstandard contracting.'   Kattell and Lember (2010) and Taylor (2009, 2003) conclude that such nonstandard contact methods ought to be part of a country's procurement tool kit. Though nonstandard contacts typically raise transactions costs—at least nominally—relative to the price discounts of arm's-length exchange, the benefits can stimulate ITT— three cornerstones of long-term economic development.

An analysis of public expenditure data among developing countries yields an important related finding: a majority of international public procurement takes place within imperfectly competitive markets. Developing country purchases account for a significant and growing share of these markets.   Consequently, rent extraction for the purposes of economic development is possible; public procurement officers need to be prepared to consider both traditional (price discounts) and nonstandard contacts to extract rents *and* pursue the most efficient course for development objectives. The next section

presents an overview of the literature and policy debates concerning procurement policy, ITT, and economic development linkages.

PUBLIC PROCUREMENT & DEVELOPMENT LINKAGES

A number of scholarly studies have shown that public procurement can foster ITT and economic development, but only when certain criteria are met. These criteria include an imperfectly competitive market setting, well trained procurement officers who can navigate the menu of contracting options at their disposal, and cooperation from economic planners to direct scarce resources to industry in a transparent, fair, and efficient manner.

McCrudden (2004) examines the use of procurement policy to promote social outcomes. He argues that at least in the social realm, government has wielded its purchasing power in procurement to effect change in various markets since the 19th century. The American 10 hour working day (1840) executive order, and the UK Fair Wages act (1891) were largely enforced by procurement contracts: company sales to the government were contingent upon adoption and adherence to the new requirements. The 20th century is peppered with numerous worldwide examples of procurement conditionality ranging from anti-discrimination clauses (gender, race, disability) to environmental standards (green procurement).[5] So while government is frequently associated with regulatory regimes to restrict or eliminate actions deemed undesirable, public procurement can also foster market creation that is fair and sustainable.

Watermeyer (2000), Bolton (2006), and Li (2011) review the experiences of the European Community, South Africa, and China respectively and draw favorable conclusions regarding public procurement and development linkages. They provide evidence of successful linkages that created jobs, stimulated technology transfer and innovation, and addressed racial and regional inequalities more efficiently than other mechanisms. Edler and Georghiou (2007) and Geroski (1990) review the empirical evidence on public procurement as an instrument for innovation and find broad support. The studies— which employ both quantitative and qualitative methodologies—

occurred over four decades (albeit only periodically) and are remarkably consistent in their results. Public procurement linkages, while raising fixed, variable, and transaction costs at least nominally, generate a higher number of innovations per dollar spent compared to other policies. Procurement linkages produce superior innovation impulses (across a longer time horizon) and are thus "a far more efficient instrument to use in stimulating innovation than any of a wide range of frequently used R&D subsidies" (Geroski, 1990, p.183).

These results notwithstanding, the evidence is mixed and lacking formal audits. For example, Brauer (2004) is skeptical of any net benefits from procurement linkages, and Haines (2012) offers case study evidence of inefficient outcomes in a prominent South African project from the late 1990s. Still, Bolton (2006, p. 213) maintains that "On the whole, procurement as a policy tool can be justified," and Arrowsmith (1995, pp. 247-248) acknowledges "where properly employed, [public] procurement may prove a useful and effective instrument...[and is] a valid and valuable tool for implementation of social policies; and one which should not be denied to government[s] without convincing justification."

Another branch of the literature examines government's role as a catalyst for technology transfer, innovation, and scale economies. Since much technological change and innovation is harvested in firms operating in imperfectly competitive markets, government oligopsony power can be efficiently leveraged to extract rents and foster ITT in the purchasing government's economy. Li (2011) analyzes the Chinese government's use of public procurement as a demand-side policy to spur innovation. The use of government procurement as a demand-side tool (a large buyer that effectively creates new demand and scale) is notable because previous intervention had focused on supply-side policies such as export subsidies and R&D injections. Public procurement linkages and other types of demand-side policies are supported by evolutionary economics and other non-linear innovation theories.[6] These theories view technological change and innovation as iterative, non-linear, and tacit in information transfer. The appeal of the public procurement-development link is the opportunity to increase collaborative ventures among end-users,

firms, and governments, and enhance learning-by-doing. Innovation-oriented public procurement, Li (2011, p. 2) finds, "enables the state to act as lead users to 'pull' innovation processes as well as to achieve social missions."

Given the theoretical and empirical support for using public procurement policy as a linkage and demand-side tool, its relative neglect in the economic development literature (and in practice) is striking. Unquestionably, the rise in prominence of the WTO and GPA has dampened interest. GPA signatory countries are generally prohibited from using ITT-style policies for development purposes. While waivers and exemptions can be requested in advance by developing countries, in practice countries are discouraged from venturing down a path that is incongruent with the liberalization statutes of the GPA.

Nevertheless, Kattel and Lember's (2010) argue that despite protestations from the WTO, emerging economy governments ought to retain the full policy toolkit—including public procurement contracts that link to ITT and development objectives. The authors contend that ascension and strict adherence to the WTO's Government Procurement Agreement (GPA) is likely to cause short-run (and even, perhaps, long-run) job losses, hamper economic growth, and result in a suboptimal equilibrium trap. The GPA aims to promote trade liberalization in public procurement via increased transparency, free trade, competition, and non-discriminatory purchasing rules. Such policies are appropriate for high-income industrialized nations, but may retard growth in emerging economies that could benefit from procurement policy-ITT links during the transitional stages of development. Indeed, historical analysis demonstrates that most advanced economies of today employed a myriad of ITT policies at similar stages in their development with favorable outcomes. [7]

Invariably, the net benefits of linking public procurement to ITT attenuate due to limitations in procurement policy design, administrative and transaction costs, and corruption within government. Kattell and Lember (2010) highlight the dilemma: many developing countries *could* benefit from sophisticated procurement-

ITT links if government officials possess sufficient training, expertise, and competencies in policy design. Without such competencies, the net benefits of said policy will greatly diminish or even turn negative. Strict adherence to the WTO's GPA requires the establishment of the types of institutions and transparencies that countries need to maximize the social returns of a link policy. Unfortunately, adoption of the GPA is effectively all-or-nothing: signatories are not afforded the opportunity to apply the beneficial toolkit of procurement-ITT policies. Instead, short-run job losses, static comparative advantages, and low-output equilibrium traps are likely to ensue.

METHODS

Having established a potential role for public procurement policy in the fulfillment of economic development objectives, we now turn our attention to the size of public sector markets among developing country governments. A lack of data on public sector expenditures—and its subset of public procurement—in developing countries has stymied most attempts to quantify the market.[8] However, new data compiled by the International Food Policy Research Institute (2011) and derived from the IMF, World Bank, and government budgets themselves permit preliminary cross-country analysis. In addition, we draw on micro data from Turkey—a country that the World Bank categorizes as an *upper-middle income* developing country—to forecast the size of public expenditures in the energy, environmental, health, and transportation sectors. To our knowledge, no such estimates exist in the literature.

We employ a simple partial equilibrium model to generate forecasts for the four sectors. The relative paucity of sector-level public expenditure data in developing countries limits the complexity and scope of the model. Assumptions about demand and growth are based on historical trend and scholarly forecasts (where available), and other variables are set as exogenous (e.g., prices, technology, war, etc.). And while these forecasts are subject to considerable revision in the presence of economy-wide shocks, they can also offer reasonable approximations of the size of the markets in question.

RESULTS

This section presents public expenditure projections for four key sectors in Turkey: energy, environment, health, and transportation. We then aggregate these projections to illustrate the growth in public sector expenditures over the next several decades.

Energy Sector

Turkey, with a 2011 GDP of USD 763 billion and per capita income of USD 10,500, is an upper-middle income emerging economy. Push and pull factors in Turkey and other developing countries are likely to increase public sector expenditures for many years to come (Yülek 2012). Push factors are based on a GDP growth, the correlated stream of tax revenues, and favorable fiscal conditions. Pull effects work in the same direction as the push factors, and are largely attributed to insufficient and depreciating infrastructure, combined with the demand for social services by devoloping country populations.

In Turkey, since 2003, the government has adopted a policy of abstaining from power generation investments in favor of private investors. The latter needs to receive permission from the independent electricity sector regulator (EPDK) to undertake investments. However, while energy investments have been the prerogative of the private sector, Turkish authorities can still influence the (private) procurement of power generation equipment with a view to support domestic value added as well as domestic technological progress.

Turkey has recorded high economic growth rates in addition to a rapidly growing population. Figure 4 plots the growth of per-capita electricity consumption which has generally been higher than the growth of real GDP. This has necessitated rapid growth in generation capacity and thus capital investment in energy generation. Under that trend, net per capita electricity consumption increased more than 250 times between 1950 and 2010, which was made possible by a more than 120 times increase in the installed electricity generation capacity (Table 1).

The annual growth rate in electricity consumption (and hence the electicity production) has moderated over time but nevertheless remained quite high. Average annual growth rate of electricity consumption stood at 13.6 percent in 1960s and decreased to (a still relatively high) 8.1 percent in 1990s. In the first decade of the new millenium, the average growth rate fell to 5.4 percent due to the impact of a major domestic financial crisis in 2001 and the affect of the global financial crises in 2009. Absent those two years, the arithmetic average of the annual growth rates in that decade was 6.8 percent.

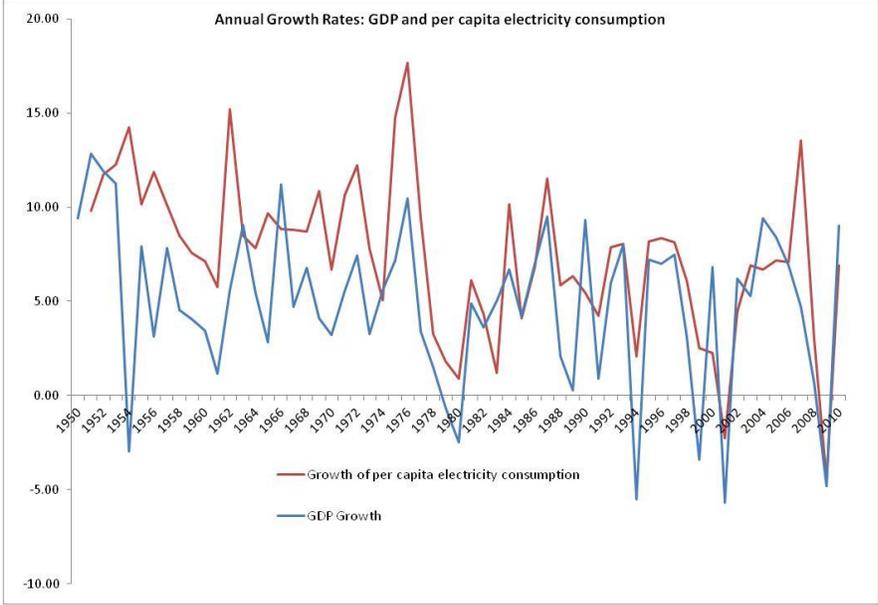## FIGURE   4

Annual Growth Rates: GDP and per capita electricity consumption

TABLE 1

Turkey: Installed electricity generation capacity, consumption and production

Years	Total installed capacity (mW)	Net electricity consumption (gWh)	Total electricity production (gWh)	Average annual growth rate in the past decade (%)
1950	408	679	790	...
1960	1,272	2,396	2,815	13.6
1970	2,235	7,308	8,623	11.8
1980	5,119	20,398	23,275	10.4
1990	16,318	46,820	57,543	9.5
2000	27,264	98,295	124,922	8.1
2010	49,524	172,051	211,208	5.4

In terms of per capita electricity consumption and production, Turkey's figures are converging to the OECD average; however, there is still a considerable difference in levels. In 2010, Turkey's per capita electricity consumption was 2,900 kWh, 36 percent of the OECD average of 8,158 kWh. In contrast, Turkey's per capita GDP (in PPP terms) in 2010 stood at 46 percent of OECD average. Thus, the convergence of Turkey's per capita GDP to OECD levels is likely to be even faster in electricity generation and capacity than in per capita GDP. Supporting this notion, in the last decade, growth of Turkey's per capita electricity consumption has been significantly faster than that of the OECD average (Table 2). This rapid growth of electricity consumption will necessitate a significant amount of investment in generation capacity.

TABLE 2

Annual average growth rate of per capita electricity consumption (2000-2010; %)			
Turkey	OECD	Germany	Poland
4.4	0.2	0.2	1.2

Projections

We used a simple framework and conservative assumptions to estimate Turkey's electricity generation investment requirement for the period 2011-2050. The framework is based on Turkey's electricity consumption growth during the same period. We assume that the average annual growth rate of per capita electricty consumption from 2000-2010 of 4.4% will continue until 2030, thereafter dampening to 4 percent during 2030-2040 and finally to 3% during 2040-2050. Under this projection, Turkey's per capita electricity consumption will reach the OECD average (which is assumed to grow by 0.3 percent per annum, higher than the actual growth rates during 2000-10 period) by 2036.

This demand-side assumption leads to a gross energy generation requirement which is based on the gross consumption (net consumption as well as transmission losses, theft) plus the net import-export balance (which is a minor item). We have assumed that the gross production-to- gross consumption ratio in the projection horizon will approximate its average during 2002-2010 period.

The generation requirement is then translated into generation capacity. We have assumed that the current configuration of the electricity generation (hydroelectric, thermal and natural gas) will remain constant during the generation horizon. We acknowledge this may not not be accurate given Turkey's recent policy to increase wind and solar plants. However, as of this time, trends in investment of these two generation sources are unclear; it is therefore appropriate to retain the current configuration in the forecast.

We have used actual statistics in the conversion rates rather than theoretical parameters. During 2002-2010, the conversion rate of total generation capacity to total electiricity generation was 4.3 (gWh/mW). Table 3 below shows Turkey's projected electricity generation (million kwh) requirement for 2010-2050, as well as the projection of the generation capacity (MW). In total, Turkey's generation capacity will have to increase to 308,812 mW in 2050 from 49,524 mW in 2010.

Capital investment in power generation differs by type of generation. We have assumed that the breakdown of the generation capacity in Turkey at the end of 2011 will remain unchanged during the projection horizon (24.1% coal, 39.9% natural gas, 32.0 percent hydroelectric, 2,7% wind, 0.2% geothermal).

Based on market rates, we have used the following unit investment costs: USD 1,4 million per MW for hydroelectric investments, USD 1,8 million per MW for coal based plants, USD 0,8 million per MW for natural gas (combined cycle) plants, USD 1.4 million for wind plants and USD 4.1 million per MW for geothermal facilities.

The results of calculations are presented in Table 3. Total investment in electricity generation facilities are forecasted to be USD 48 billion for the period 2012-2023 and USD 209 bilion for 2024-2050.

TABLE 3

Electricity Consumption, Capacity, and Investment Projection Summary (2011 prices)				
	2012-2023	2024-2050		
Private sector generation investment (Billion USD)	48,196	209,070		
	2000-2010	2012-2023	2024-2050	2012-2050
Average annual growth rate of per capita electricity consumption in Turkey	4.4	4.4	3.9	4.0

Average annual growth rate of per capita electricity consumption in OECD	0.2	0.3	0.3	0.3
Average annual growth rate of installed capacity	6.2	5.7	4.3	4.7
	Installed Capacity (mW)			
	2000	**2010**	**2023**	**2050**
Turkey	27,264	49,524	99,743	308,812.31
	Per Capita Electricity Consumption (kwh)			
	2000	**2010**	**2023**	**2050**
Turkey	1,891	2,900	5,146	14,379
OECD	7,957	8,158	8,641	9,369

Environmental Sector

Turkey will need substantial investments in the environmental sector during the next decades. One contributing factor is the EU membership process, under which Turkey has committed to meet targeted thresholds and European environmental directives. The government has undertaken preparatory studies to assess the costs of the EU directives. A study by the Ministry of Water Environment (formerly Ministry of Environment) was released in 2006 that forecasts the investment costs[†] (Table 4). We are basing our numbers on this detailed study.

TABLE 4

[†] AB Entegre Çevre Uyum Stratejisi ("EU Integrated Adaptation Strategy"), 2006.

EU Integrated Adaptation Strategy (2012-2023)*		
	2007-2011	**2012-2023**
Total environmental capital investment	79.2	64.6
Public	58.7	48.6
Private	20.5	16.0
Source: EU Integrated Adaptation Strategy, Ministry of Environment, 2006		
* USD-euro exchange rate is set at 1.35 over the 2007-2023 period		

Our projections reveal that public sector environmental investments in Turkey will total roughly USD 49 billion between 2012-2023. To convert figures from euro to USD we used a USD-€ exchange rate of 1.35 for the projection horizon.

Sectoral breakdown

The *water utility sector* tops the list of required investments representing more than half of total environental investments needed. It covers treatment of city waste water (with a total investment requirement of € 18.1 billion), potable water systems (€ 12.7 billion), and other related investments. Total necessary investment cost is estimated at € 34 billion.

Solid waste investment requirements cover items that require heavy capital expenditure such as regular storage, hazardous waste, wrap waste, and waste burning. The projected costs do not include investments to be incurred mostly by the private sector (transportation of waste, waste oil, PCB7PCT, waste batteries, junk cars, waste electrical and electonic equipment and RoHS).

The investments related to solid waste are expected to cover the closure of old waste areas, establishment of new regular storage areas to destroy hazardous and household waste, collection systems, compost and burning areas, recovery of construction waste, recovery

of mixed waste, transmission centers and transportation systems of hazardous waste. Investments are estimated at € 9.5 billion.

Air pollution control investment requirements include establishment of air quality measurement stations and monitoring systems. Other investments such as calibration laboratories and a national calibration center are not included in the projections. In sum, investment cost for this category stands at a relatively low € 37 million.

Industrial pollution control investments have to be undertaken to a large extent by the private sector entities. These are estmated at roughly € 13.6 billion. The public sector is expected to establish large burning centers with cost estimates of € 1.1 billion until 2023 and € 700 million after 2023.

Environmental conservation is estimated to involve a total expenditure of € 254 million. Of this, € 120 million represents capital expenditure and the rest is personell and other current costs. In our projections, we have distributed the investment costs evenly from 2014-2023.

Horizontal investment requirements cover national environmental information, an Exchange network, and environmental information systems at a projected cost of €558 million.

When these requirements are combined, public sector environmental investments sum to USD 64 billion (an average of USD .4 billion per annum) through 2023 (Figure 5). The actual investment outlays will be a function of budgetary resources and financing available. Table 5 delineates the different environmental investments.

FIGURE 5
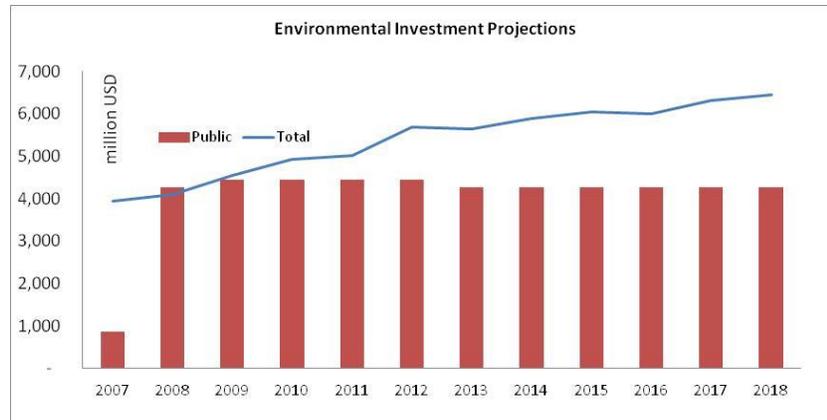
TABLE 5 Environmental Investment Projection Summary
(billion USD; 2012-2023)

	Total	Public	Private
Annual average environmental capital investment	5.4	4.0	1.3
Total environmental capital investment	64.4	48.6	15.9
Water	35.7	35.7	0.0
Solid waste	10.4	10.4	0.0
Industrial	17.3	1.5	15.9
Other	0.9	0.9	0.0

Health Sector

In Turkey, health sector investments are made by both the private and public sectors. During the last decade, private and public health

investments averaged 0.62 percent and 0.23 percent of GDP, respectively. As GDP rose rapidly, total dollars of health expenditures increased as well. Capital expenditures in the health sector are divided between construction and equipment.

Parallel to increasing capital expenditures, imports of medical equipment have increased significantly over the last four decades. Three factors seem to have played a role: significant liberalization of international trade following 1980, increasing income and individual health awareness, and an increase in the number of private health service providers. As a result, the average ratio of health equipment imports to GDP increased from less than 0.02 percent of GDP in 1970s to 0.2 percent during 2000s (Figure 6). The two series are related to each other with a high correlation (0.98 for the period 1998-2000).

FIGURE 6

Health Equipment Imports (% of GDP)

A related measure is the correlation between health equipment imports and health capital expenditure (Figure 7). Between 1998 and 2010, an average of 24 percent of capital expenditures went towards health equipment (and material) imports.

FIGURE 7
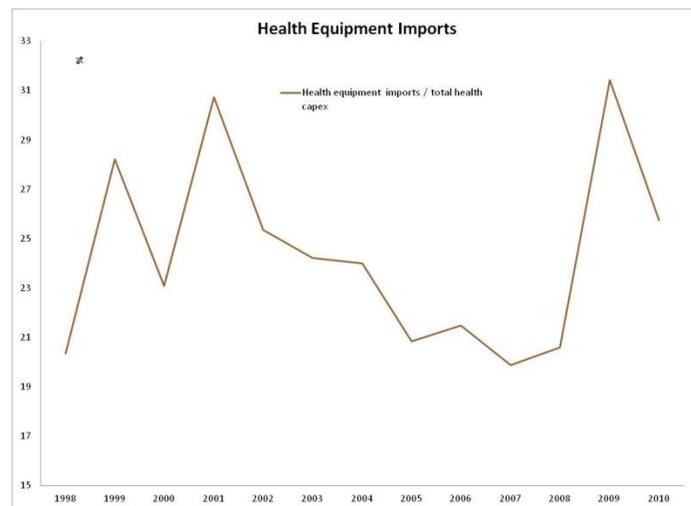
We used a simple and conservative framework to project future health sector capital expenditures. Projections were based on the average ratio of health capital expenditure to GDP by public and private entities during 2000-2011. We assumed these ratios will not increase during the coming decades (Table 6). Those constant ratios were applied to GDP in 2011 prices. We assumed Turkish GDP will grow at an even growth rate of 5 percent during 2012-2050. The average growth rate of Turkish GDP from 2002-2008 was 5.8 percent (Turkish Statistical Institute 2012).

The results are presented in Figure 8 and Table 6. During 2012-2050, a total of USD 789 billion worth (in 2011 prices) of capital expenditures in the health sector will be made in Turkey. Out of this, USD 214 billion will be incurred by the public sector and USD 576

billion by private entities. Average annual capital expenditure is projected to be USD 5.5 billion and USD 14.8 bilion, respectively.

For the period 2012-2023 total public and private health sector capital expenditures are projected as USD 29.8 billion and USD 80.3 billion, respectively. That translates into an average annual capital expenditure of USD 2.5 billion from the public sector and USD 6.7 billion from private entities.
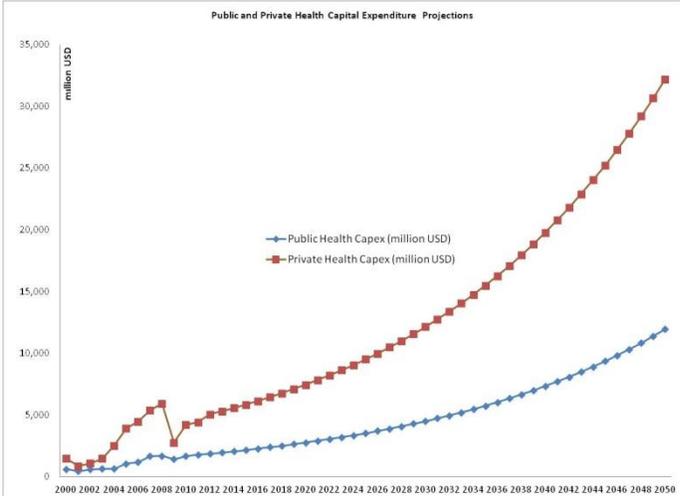
FIGURE 8

Public and Private Health Capital Expenditure Projections

TABLE 6

Projection Summary			
	2000-2011 (Actual)	2012-2023 (Projections)	2012-2050 (Projections)

Public health capital expenditure (% of GDP)	0.23	0.23	0.23
Private health capital expenditure (% of GDP)	0.62	0.62	0.62
Average annual GDP growth rate (%)	10.2	5.0	5.0
Total public health capital expenditure (billion USD)*	13.4	29.8	213.5
Total private health capital expenditure (billion USD)*	38.5	80.3	575.6
Average annual public health capital expenditure (billion USD)*	1.2	2.5	5.5
Average annual private health capital expenditure (billion USD)*	3.5	6.7	14.8
*In 2011 prices			

Transportation

In the transportation sector, we present data for railway and rolling stock investments. The development of the railway sector has been a priority of the Turkish government since 2002. This is a stark change in policy relative to the 1950-2000 period, when little priority was accorded to the railways. Due to five decades of under-investment, however, the capital stock in this sector is very low compared to peer countries at similar stages of economic development.

The government's plan calls for significant investments in the sector through 2023. A summary of the targets is presented in Table 7 below. Public sector investment for the transportation sector is estimated at USD 56 billion through 2023.[9]

TABLE 7

Targeted railway investments (millions of USD, 2010 prices)	
High speed railway	38,902
Conventional railways	5,463
Electrification and signalization of current conventional railways	2,994
Rolling Stock	5,191
Repairs on existing railways	1,772
Logistics Centers	567
City suburban railways	564
Others	281
Total	55,734

Summary of Aggregate Projections

Turkey is projected to make considerable capital investments in energy, health, environment and transportation in the coming years to support economic development. Our calculations show that in these four sectors, the total amount of investment outlays between 2012 and 2023 are forecasted to reach USD 278 billion with public and private entities having an almost equal share. Over the following decades, investment in these same sectors will grow by another USD 888 billion, emanating mostly from the health sector.   Table 8 provides a summary of our projections.

TABLE 8

Summary of Capital Expenditures in Energy, Health, Environmental and Transportation Sectors

	Private	Public	Total	Private	Public	Total
Energy [a]	48.2	-	48.2	209.1	-	209.1
Health [a]	80.3	29.8	110.1	495.3	183.7	679.0
Environmental [b]	15.9	48.6	64.4	...	...	...
Transportation [a, c]	...	55.7	55.7	...	...	...
Total	144.3	134.1	278.4	704.3	183.7	888.1
a=2011 USD.						
b=2007 USD.						
c= Does not include local (within city) transportation investments.						

With these forecasts, we can calculate the approximate size of international public procurement markets for a middle-income emerging economy like Turkey. The four sectors reviewed in this paper—energy, environmental, health, and transportation—are highly capital intensive in their production processes. Consequently, a significant portion of public expenditures for these sectors will be imports from imperfectly competitive markets. Inferring from data in this paper, we estimate international public procurement to be roughly 17-20% of aggregate government expenditures in these four sectors. Under this scenario, the size of the international public procurement market for Turkey is USD 47.3-55.6 billion through 2023, and USD 151-177.6 billion through 2050.

CONCLUDING REMARKS

In this paper, we reviewed the literature on public procurement as a policy tool in support of ITT and development objectives. The literature is mixed, but since 1990 an increasing number of scholarly studies argue that linking public procurement to development outcomes does yield, despite some inevitable costs, positive net benefits for the average developing country. In competitive market

environments, the purchasing government is better-off scouring the world market (both home and foreign) and bargaining for simple price discounts. Price converges to cost in these industries and there are virtually no rents to extract.

Conversely, in imperfectly competitive markets procurement officers need to consider a myriad of contractual arrangements to leverage the country's purchasing power and maximize long-term welfare. Collaboration and consultation with development economists and country planners is critical at this stage in the tendering process. In some instances, traditional arm's-length exchange and price discounts on the base product will be welfare-maximizing for a given transaction. In other (oligopsonistic) exchange settings, nonstandard contracts such as countertrade, foreign investment, offsets, and strategic alliances can be linked to the base procurement to foster industrialization, technology, and trade (ITT).

The second half of the paper focused on the potential size of public sector markets in the coming decade and beyond. Forecasts of public expenditures in Turkey—our case country— were constructed for four sectors undergoing rapid expansion. The empirical results demonstrate a positive trend in public expenditures, including international public procurement. The rise in public expenditures on foreign capital is likely to be sustained over both the medium and long term due to both push and pull factors. The billions of dollars in public procurement transactions represent an untapped asset for many developing countries; properly trained procurement officers—in collaboration with economic planners—can leverage a government's purchasing power in support of sustainable development objectives.

REFERENCES

Arrowsmith, S. (1995). "Public Procurement as an Instrument of Policy and the Impact of Market Liberalization." *Law Quarterly Review, 111*: 235-285.

Bolton, P. (2006). "Government Procurement as a Policy Tool in South Africa." *Journal of Public Procurement, 6* (3): 193-217.

Brauer, J. (2004). "Economic Aspects of Arms Trade Offsets," in Brauer, J. and Dunne, P. (eds.) *Arms Trade and Economic Development—Theory, Policy, and Cases in Arms Trade Offsets*: 58-68. New York, New York: Routledge.

Callendar, G. and Mathews D. (2000). "Government Purchasing: An Evolving Profession?" *Journal of Public Budgeting, Accounting & Financial Management*, 12 (2): 272-290.

Chang, H. (2002). *Kicking Away the Ladder*. London, UK: Anthem Press.

Edler, J. and Georghiou, L. (2007). "Public Procurement and Innovation – Resurrecting the Demand Side." *Research Policy 36* (7): 949-963.

Geroski, P. (1990). "Procurement Policy as a Tool of Industrial Policy." *International Review of Applied Economics* 4 (2): 182-198.

Haines, R. (2012). "The Complexities of Development: The South African National Industrial Participation Programme in Perspective," in Yülek, M. and Taylor, T. (eds.) *Designing Public Procurement Policy in Developing Countries: How to Foster Technology Transfer and Industrialization in the Global Economy*: 111-139. New York, New York: Springer.

International Monetary Fund (IMF) (2011). Available at http://www.imf.org/external/pubs/ft/weo/2011/02/weodata/weoselser.aspx?c=186&t=1 [Retrieved March 28, 2012]

International Food Policy Research Institute (2011). *Statistics of Public Expenditure for Economic Development (SPEED)*. Available at http://www.ifpri.org/book-39/ourwork/programs/priorities-public-investment/speed-database [Retrieved December 28, 2011]

Kattel, R. and Lember, V. (2010). "Public Procurement and Industrial Policy Tool: An Option for Developing Countries?" *Journal of Public Procurement 10* (3): 368-404.

Li, Y. (2011, June). "Public Procurement as a Demand-Side Innovation Policy Tool in China – a National Level Case Study." Paper presented at DRUID Innovation, Strategy, and
Structure, Copenhagen Business School, Denmark.

Lipsey, R. and Lancaster, K. (1956). "The General Theory of Second Best." *The Review of Economic Studies 24* (1): 11-32.

List, F. (1885). *The National System of Political Economy*. Translated
        from German by Sampson
S. Lloyd. London, UK: Longman, Greens, and Co.

McCrudden, C. (2004). "Using Public Procurement to Achieve Social Outcomes." *Natural Resources Forum 28*: 257-267.

Reinert, E. (2008). *How Rich Countries Got Rich…and Why Poor Countries Stay Poor*. Jackson, TN: Public Affairs.

Taylor, T. (2009). "Offset Policy Design in International Procurement." In Thai, K. (ed.), *International Handbook of Public Procurement*: 749-762. Boca Raton, FL: Taylor & Francis Group.

Taylor, T. (2003). "The Proper Use of Offsets in International Procurement." *Journal of Public Procurement* 3 (1): 338-356.

Thai, K. (2005). "Challenges in Public Procurement." In K. V. Thai et al. (eds.), *Challenges in Public Procurement: An International Perspective*: 1-19. Boca Raton, FL: PrAcademics Press.

Trionfetti, F. (2000). "Discriminatory Public Procurement and International Trade." *The World Economy 23* (1): 57-76.

Turkish Government. (2006). "EU Integrated Adaptation Strategy." Ankara: Ministry of Environment.

Turkish Statistical Institute. (2012). Available at http://www.turkstat.gov.tr/VeriBilgi.do?tb_id=57&ust_id=16 [Retrieved March 1, 2012]

Watermeyer, R. (2000). "The Use of Targeted Procurement as an Instrument of Poverty Alleviation and Job Creation in Infrastructure Projects." *Public Procurement Law Review 9* (5): 226-50.

Yülek, M. (2012). "Public Expenditures on Machinery and Equipment in Developing Countries: A Potential Driver of Technological Development and Industrialization," in Yülek, M. and Taylor, T. (eds.) *Designing Public Procurement Policy in Developing Countries: How to Foster Technology Transfer and Industrialization in the Global Economy*: 111-139. New York, New York: Springer.

---

[1] The heterodox approach taken in this paper resembles the "New Consensus," to economic development policy, as opposed to the "Washington Consensus."

[2] Ideally, public sector expenditures would be delineated among the central government, regional, and local levels. However, at present these data are not available. The data included herein, then, focuses on central government expenditures but also likely includes expenditures from other administrative levels.

[3] Computed using 2005 international dollars.

[4] Modern economic growth policies often focus on moving up the "value chain" in terms of production processes and technologies. Production processes exhibiting increasing returns typically involve high value-added activities which result in higher incomes for workers. The goal is to move up the value chain in a manner that is consistent with the technology and

resources of the country. Significant and rapid departure from a country's comparative advantage is, then, not advised.

[5] Globalization is aided by such linkages. In the absence of international legal agreements (the "stick"), labor standards can be elevated by the free market "carrot" of international public procurement. McCrudden (2004) cites the experiences of Germany, South Africa, Canada, and Malaysia in this regard.

[6] Government intervention in the marketplace—not necessarily via public procurement policy—is theoretically viable in select settings based on market failure. The evolutionary economics notion of "systemic failure" may also warrant a public sector response. Finally, Lipsey and Lancaster's (1956) Theory of Second Best shows that prudent policy can, theoretically, be welfare-enhancing in settings characterized by market failure.

[7] For an overview of historical evidence, see, for example, Reinert (2008), Chang (2002), and List (1885).

[8] Trionfetti (2000) is a notable exception. He estimates public procurement at 8 to 10% of GDP for industrialized countries. Developing country estimates were not provided.

[9] This figure does not include underground rail systems and light rail systems for urban transportation. Turkish towns need a significant amount of such investments. Fewer than 10 cities out of 81 have underground and light rail systems in Turkey.