AN APPLICATION OF THE CEQ EFFECTIVENESS
INDICATORS: THE CASE OF IRAN

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The CEQ logo is a stylized graphical representation of a Lorenz curve for a fairly unequal distribution of income (the bottom part of the C, below the diagonal) and a concentration curve for a very progressive transfer (the top part of the C).

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ABSTRACT

This chapter provides an application of the new CEQ effectiveness indicators for the case of Iran. The Impact and Spending Effectiveness indicators are used to assess the performance of the taxes and transfers in reducing inequality while Fiscal Impoverishment and Gains Effectiveness indicator is utilized to measure the performance of the components of the Iran's fiscal system with regard to the reduction in poverty (or not exacerbating it in the case of taxes). I find that in the case of Iran, transfers are relatively more effective in reducing inequality than taxes. For example, direct transfers together realize about 40% of their potential to reduce inequality while direct taxes together only realize about 20% of their potential. Direct and indirect taxes are

especially effective in raising revenue without causing poverty to rise, a desirable property of fiscal systems. While transfers are not targeted toward the poor, they reduce poverty significantly. The main driver is the Targeted Subsidy Program (TSP), a universal cash transfer program implemented in 2010 to compensate individuals for the elimination of energy subsidies. In spite of its large poverty reducing impact, the effectiveness of TSP is rather low because of its universality.

Introduction

The main goal of this chapter is to provide an application of the new CEQ effectiveness indicators. For this purpose, I focus on the case of Iran and I use three main effectiveness indicators introduced previously in this handbook. The Impact Effectiveness (IE) and Spending Effectiveness (SE) indicators are solely utilized to measure the performance of taxes and transfers in reducing inequality (i.e. traditional Gini). The Fiscal Impoverishment and Gains Effectiveness indicator (FI/FGP) is used to measure how well various elements of the fiscal system perform in reducing poverty (or not to increase it for the taxes). For the latter indicator, poverty gap is the preferred index that I use to measure the change in poverty.

I find that taxes are very effective in raising revenue without increasing poverty in a significant way and also moderately effective in reducing inequality. In contrast, because transfers are universal and not targeted to the poor, they realize less than 17 percent of their potential to reduce poverty with no one transfer exceeding 21 percent of its potential. With regard to inequality, (direct) transfers collectively are relatively more effective than (direct) taxes. Direct taxes only realize about 20 percent of their potential power in reducing inequality while direct transfers realize about 40 percent of their potential.

In what follows, first I review the CEQ effectiveness indicators used in this chapter. In section 2, I introduce the Iranian household survey used for this exercise. Section 3 presents the results of the effectiveness indicators for main taxes and transfers in Iran. Finally, section 4 concludes.

1 Methodology

Following the notation used throughout this Handbook, this chapter uses *T* and *B* to refer to taxes and benefits respectively. As it was mentioned in Enami (2018) the new CEQ effectiveness indicators rely on the concept of marginal contribution. One can calculate the marginal contribution (MC) of any combination of taxes or benefits as follows:

$$MC_{T\ (and/or\ B)}^{\text{End income}} = Index_{End\ income \backslash T\ (and/or\ B)} - Index_{End\ income},$$

where *Index* refers to any inequality or poverty indicator that may be used to calculate the marginal contribution (e.g. Gini or Poverty Gap). *End income,* refers to the income concept used to calculate the marginal contribution to the index of a tax or benefit. For example, $Gini_{Disposable\ Income}$ refers to the Gini coefficient of disposable income, and using $Gini_{Disposable\ Income}$ for $Gini_{End\ income}$ implies that we are interested in calculating the marginal

contribution of a tax or benefit to the disposable income Gini. *End income\T (and/or B)* refers to the income concept that is equivalent to *End income* prior to the tax or benefit of interest[1].

Impact Effectiveness (IE) is defined as the ratio of the observed MC of a tax (transfer) to the optimum MC of that tax (transfer) if it is distributed in a way that maximizes its inequality or poverty reducing impact (Enami, 2018). The following equation shows how this indicator is defined mathematically:

$$Impact\ Effectiveness_{T\ (and/or\ B)}^{End\ income} = \frac{MC_{T\ (and/or\ B)}^{End\ income}}{MC_{T\ (and/or\ B)}^{End\ income\ *}}\ ,$$

where $MC_{T\ (and/or\ B)}^{End\ income\ *}$ is the maximum possible $MC_{T\ (and/or\ B)}^{End\ income}$ if the same amount of *T (and/or B)* is distributed differently among individuals. For example, for the Gini index we deduct taxes from (add benefits to) the richest (poorest) until her income becomes equal to the second richest (poorest), then deduct taxes from (add benefits to) these two richest (poorest) until their incomes become equal to the third richest (poorest), and we continue this procedure until we end up with the same total value of *T (B)* that we observe in the actual system. If the indicator of interest is a Gini or S-Gini index, the Impact Effectiveness indicator is identical to what is proposed by Fellman and others.[2] This indicator shows the relative realized power of a tax or transfer in reducing inequality

The Spending Effectiveness (SE) indicator is defined as the ratio of the minimum amount of a tax (transfer) required to be collected (spent) in order to create the observed MC of the tax (transfer), if the tax (transfer) is instead redistributed optimally (Enami, 2018). The following equation shows how this indicator is calculated:

$$Spending\ Effectiveness_{T\ (and/or\ B)}^{End\ income} = \frac{T^*\ (and/or\ B^*)}{T\ (and/or\ B)}\ ,$$

where $T^*\ (and/or\ B^*)$ is the minimum amount of *T* (or *B*) that is needed to create the same $MC_{T\ (or\ B)}^{End\ income}$ using the same redistribution procedure that was discussed previously to find the maximum MC.

This indicator shows how much less tax (transfer) is required to achieve the same observed outcome (in terms of inequality reduction) if the tax (transfer) is collected (spent) in a way that maximizes the reduction in inequality. It should be noted that the Spending Effectiveness indicator can only be calculated for the taxes and transfers with a positive MC.

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[1] See Enami (2018) and Enami, Lustig, and Aranda (2018) for a more detailed description of the concept of Marginal Contribution.
[2] See Fellman and others (1999).

Finally, using two concepts of Fiscal Impoverishment (FGP) and Fiscal Gains to the Poor in traduced in Higgins and Lustig (2016), Fiscal Impoverishment and Gains Effectiveness indicator (FI/FGP) is defined as follows for taxes and transfers (Enami, Higgins, and Younger, 2018):

$$Tax\ Effectiveness_{FI} = \frac{T - FI\_MC_T^{End\ income}}{T},$$

$$Transfer\ Effectiveness_{FGP} = \frac{FGP\_MC_B^{End\ income}}{B},$$

where T and B are the size of total taxes and transfers (both positive values), $FGP\_MC_B^{End\ income}$ is the marginal contribution of transfer B to FGP (always a non-negative value), and $FI\_MC_T^{End\ income}$ is the marginal contribution of tax T to FI (always a non-negative value).[3]

As a final note, for all of the three effectiveness indicators introduced above (IE, SE, and FI/FGP), the value of the effectiveness indicators increases as a tax or transfer gets closer to its maximum potential in reducing inequality or poverty.
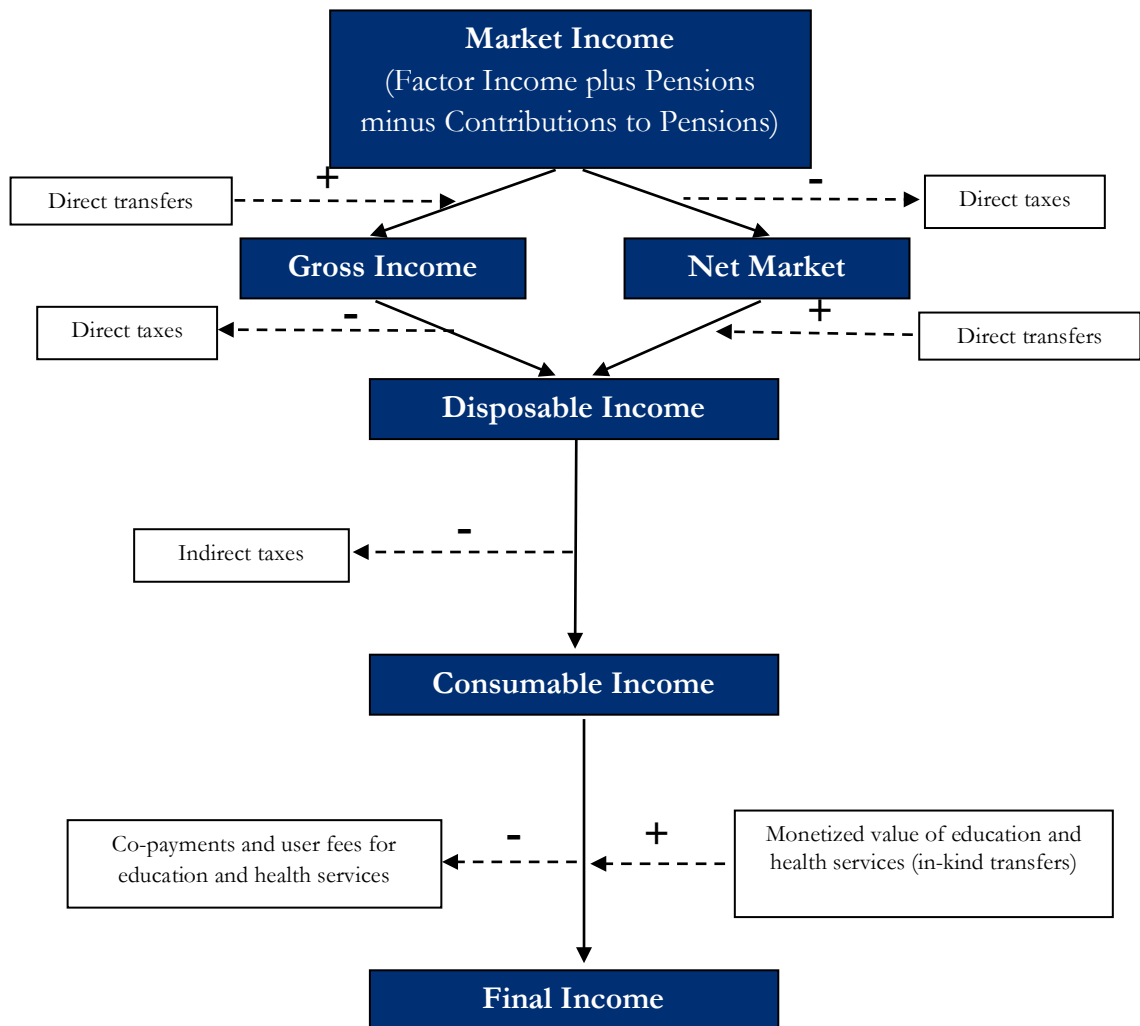
2 Data

The data for this analysis is from the 1390 (2011-12) round of the Iranian Household Expenditure and Income Survey (HEIS). The Statistical Center of Iran conducts this survey every year and its sample represents all rural and urban areas of Iran. In 2011-2012, the year of survey that is used in this analysis, there were 18,727 urban and 19,786 rural households in the sample. These households represent about 56.4 million urban and 23.1 million rural individuals. For each one of the households in the sample, I follow the CEQ income concepts diagram in chapter 1 by Lustig and Higgins in this handbook and reproduced below, which shows how different CEQ income concepts are created, and I construct different main income concepts as well as income components (that is, taxes and transfers) as described in table 17-1. A detailed review of this system and empirical statistics are provided by Enami and others.[4] Here, I focus on calculating the effectiveness indicators discussed in the previous section, using Disposable, Consumable, and Final Incomes as the income concepts for *End income* in the previous notations. Therefore, the effectiveness of each tax and transfer will be with respect to these income concepts.

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[3] FGP and FI are in Higgins and Lustig (2016) and the article is reproduced as Chapter 4 in this Handbook. A brief description can be found in Chapter 1 by Lustig and Higgins and the instructions on how to calculate them with the CEQ Stata Package are in Chapter 8 by Higgins.
[4] See Enami, Lustig, and Taqdiri (2016).

Figure 17-1: Income Concepts Diagram According to the CEQ Methodology

Market Income
(Factor Income plus Pensions minus Contributions to Pensions)

Direct transfers +

Direct taxes -

Gross Income

Net Market

Direct taxes -

Direct transfers +

Disposable Income

Indirect taxes -

Consumable Income

Co-payments and user fees for education and health services -

+ Monetized value of education and health services (in-kind transfers)

Final Income

Source: Adapted from Chapter 1 in this Handbook: Lustig and Higgins (2018).

Table 17-1: Description of Market Income and Other Income Components for Iran

Main Categories	Sub Categories	Description
Market Income	Factor Income	All monetary and non-monetary income received as an employee or self-employed individual excluding any subsidy or social assistance and including imputed rent for home owners. All components are directly observed in the survey.
	Contributory Pensions	All pensions received through the retirement programs. The relevant information is observed directly in the survey.
	Employee contributions to the Social Security Insurance	The deductions from employees' paychecks that is paid for the social security insurance (i.e. pension) of an employee. The relevant information is observed directly in the survey.
	Employer contributions to the Social Security Insurance	The employers' payment toward the social security insurance (i.e. pension) of employees. Since this is a mandatory payment and we assume it results in lower payments to employees, we include it as a type of deduction. The relevant information is observed directly in the survey.
Direct Taxes and Contributions	Income Tax	Income tax for self-employed individuals (observed directly in the survey) and payroll tax for employees (imputed using the data about gross and net income as well as contributions to pensions).
	Employee contributions to the health insurance	The deductions from employees' paychecks that is paid toward the health insurance. The relevant information is observed directly in the survey.
	Employer contributions to the health insurance	The employers' payment toward the health insurance of employees. Since this is a mandatory payment and we assume it results in lower payments to employees, we include it as a type of deduction. The relevant information is observed directly in the survey.
Direct Transfers	Targeted Subsidy Program	The direct cash transfer program that is established by the government following the energy subsidy reform in Iran. The relevant information is observed directly in the survey.
	Social Assistance	Includes all cash transfers to low income individuals through public organizations. The relevant information is observed directly in the survey.
	Semi-cash Transfers (Food)	Include the monetary value of all edible items that a household receives for free. The values are imputed assuming all edible goods that are obtained "free but not from other households" are provided by the different public agencies.
Indirect Taxes	…	Sales taxes. Imputed using the 3% statutory rate (which is applicable to most of goods) and the information available in the survey about the consumption expenditure of each household)
In-kind Transfers	Education	Includes a nominal subsidy for each student in a household depending on the grade minus any user fees (the latter is observed directly in the survey)
	Health	Includes a nominal subsidy for each individual in a household with health costs minus these costs (the latter is observed directly in the survey)

Note: … Not applicable.

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3 Results: Effectiveness of Taxes and Transfers in Reducing Inequality and Poverty

This section provides the value of the effectiveness indicators discussed previously for different taxes and transfer programs in Iran. Note that the Impact and Spending Effectiveness indicators are only estimated for the Gini index. Tables 17-2, 17-3, and 17-4 present the results for the Impact Effectiveness, Spending Effectiveness, and FI-FGP Effectiveness indexes respectively.

Focusing on table 17-2 with respect to final income, income tax has the highest impact effectiveness among direct taxes in fulfilling about 38 percent of its potential in reducing inequality. The highest effectiveness, however, belongs to "Social Assistance" (a direct transfer), which fulfills about 43 percent of its potential. The lowest impact effectiveness among interventions with a positive MC is "Employee Contributions to the Health Insurance," with about 8 percent effectiveness. Health user fees are the worst with regard to increasing the effect on inequality while having relatively more potential to reduce it.

Table 17-2: Impact Effectiveness Indicators for Taxes and Transfers in Iran

Fiscal Intervention		Impact Effectiveness with respect to:		
		Disposable Income	Consumable Income	Final Income
Direct Taxes and Contributions	Income Tax	0.3239	0.3532	0.3844
	Employee contributions to the health insurance	0.0515	0.0382	0.0829
	Employer contributions to the health insurance	0.1288	0.1319	0.1595
	Total Direct Taxes and Contributions	**0.1847**	**0.1758**	**0.2087**
Direct Transfers	Targeted Subsidy Program	0.3924	0.3962	0.3841
	Social Assistance	0.4239	0.4202	0.4303
	Semi-cash Transfers (Food)	-0.0362	-0.0391	-0.0437
	Total Direct Transfers	**0.4183**	**0.4211**	**0.4053**
Indirect Taxes (Sales Taxes)		…	**-0.1370**	**-0.1391**
In-kind Transfers	Education Transfers	…	…	0.2322
	Education User-fees	…	…	0.1563
	Health Transfers	…	…	0.3298
	Health User-fees	…	…	-0.2455

Source: Author's calculations using the Iranian household survey of year 1390 (2011-12).
Notes: The table includes the value of the Impact Effectiveness indicator for each component of the fiscal system. The Gini coefficient is the index used to calculate the effectiveness indicator here.
… Not applicable.

With regard to the spending effectiveness (table 17-3) shown in the "Final Income" column, "Social Assistance" (with about 40 percent) and "Income Tax" (with about 35 percent) are the two most effective interventions. The least effective category is "Employee Contributions to

Health Insurance" with almost zero effectiveness. That result means that with a contribution only a small fraction of its current size, the same level of reduction in inequality could be achieved as is currently produced.

Table 17-3: Spending Effectiveness Indicators for Taxes and Transfers in Iran

Fiscal Intervention		Spending Effectiveness with respect to:		
		Disposable Income	Consumable Income	Final Income
Direct Taxes and Contributions	Income Tax	0.3190	0.3101	0.3511
	Employee contributions to the health insurance	$\cong 0$	$\cong 0$	$\cong 0$
	Employer contributions to the health insurance	0.1237	0.1145	0.1360
	Total Direct Taxes and Contributions	**0.1645**	**0.1595**	**0.1887**
Direct Transfers	Targeted Subsidy Program	0.2847	0.2871	0.2651
	Social Assistance	0.4022	0.4066	0.3999
	Semi-cash Transfers (Food)	N/A	N/A	N/A
	Total Direct Transfers	**0.2942**	**0.2971**	**0.2753**
Indirect Taxes (Sales Taxes)		…	**N/A**	**N/A**
In-kind Transfers	Education Transfers	…	…	0.1750
	Education User-fees	…	…	0.1513
	Health Transfers	…	…	0.2700
	Health User-fees	…	…	N/A

Source: Author's calculations using the Iranian household survey of year 1390 (2011-12).
Notes: The table includes the value of the Impact Effectiveness indicator for each component of the fiscal system. The Gini coefficient is the index used to calculate the effectiveness indicator here.
NMC. Fiscal interventions with "NMC" have a negative marginal contribution, making it mathematically impossible to calculate their spending effectiveness.
… Not applicable.

FI-FGP effectiveness indicators are presented in table 17-4. As previously mentioned, taxes and transfers should not be compared to each other because taxes can only increase poverty whereas transfers can only reduce it. All taxes are highly effective in raising revenue without increasing poverty in a significant way, whereas direct transfers are not very efficient in reducing poverty. "Social Assistance" has the highest effectiveness (about 21 percent with respect to consumable income) and "Semi-Cash Transfers" has the lowest (about 4 percent with respect to consumable income). The poverty reduction effectiveness of the targeted subsidy program is about 21 percent.

Table 17-4: Fiscal Impoverishment and Fiscal Gains to Poor Effectiveness Indicators for Taxes and Transfers in Iran

Fiscal Intervention		$4PPP FI-FGP Effectiveness with respect to:	
		Disposable Income	Consumable Income
Direct Taxes and Contributions	Income Tax	0.9984	0.9964
	Employee contributions to the health insurance	0.9879	0.9837
	Employer contributions to the health insurance	0.9964	0.9955
	Total Direct Taxes and Contributions	**0.9945**	**0.9923**
Direct Transfers	Targeted Subsidy Program	0.1340	0.1492
	Social Assistance	0.1826	0.2069
	Semi-cash Transfers (Food)	0.0344	0.0387
	Total Direct Transfers	**0.1464**	**0.1619**
Indirect Taxes (Sales Taxes)		…	**0.9567**

Source: Author's calculations using the Iranian household survey for year 1390 (2011-12).

Notes: The FI-FGP effectiveness indicators are bounded between zero and one and the higher the value of an indicator, the better the tax is at *not* increasing poverty and a transfer is at reducing poverty.

PPP. Purchasing power parity. In calculating PPP values, I use the 2005 round of International Comparison Program (ICP) as reported in the World Development Indicators (WDI) published by the World Bank. To transform monetary values from the year of the survey to 2005, we used the CPI index from the WDI.

… Not applicable.

4 Conclusion

This chapter provides an application for the new CEQ effectiveness indicators by analyzing the Iran's fiscal system. For the case of inequality, I use two measures of Impact and Spending Effectiveness, and for the case of poverty, I rely on the Fiscal Impoverishment and Gains Effectiveness indicator. Using the 1390 (2011-12) round of the Iranian Household Expenditure and Income Survey (HEIS), I find mixed results for how effective taxes and transfers are in reducing inequality and poverty compared to their potential. Taxes are very effective in raising revenue without increasing poverty and are moderately effective in reducing inequality. On the other hand, transfers, exhibit a similar, moderate effectiveness in reducing inequality to that of taxes, but they are not focused on poor households, and realize less than 17% of their potential power to reduce poverty.

References

Enami, Ali. 2018. "Measuring the Effectiveness of Taxes and Transfers in Fighting Inequality and Poverty". Chapter 5 in Nora Lustig (editor), *Commitment to Equity Handbook. Estimating the Impact of Fiscal Policy on Inequality and Poverty.* Brookings Institution Press and CEQ Institute, Tulane University. Advance online version available at http://www.commitmentoequity.org/publications/handbook.php.

Enami, Ali, Sean Higgins, and Stephen D. Younger. 2018. "Box 1-3. Fiscal Impoverishment and Gains Effectiveness Indicators," in Chapter 1 in Nora Lustig (editor), *Commitment to Equity Handbook. Estimating the Impact of Fiscal Policy on Inequality and Poverty.* Brookings Institution Press and CEQ Institute, Tulane University. Advance online version available at http://www.commitmentoequity.org/publications/handbook.php.

Enami, Ali, Nora Lustig, and Rodrigo Aranda Balcazar. 2018. "Analytic Foundations: Measuring the Redistributive Impact of Taxes and Transfers". Chapter 2 in Nora Lustig (editor), *Commitment to Equity Handbook. Estimating the Impact of Fiscal Policy on Inequality and Poverty.* Brookings Institution Press and CEQ Institute, Tulane University. Advance online version available at http://www.commitmentoequity.org/publications/handbook.php.

Enami, Ali, Nora Lustig, and Alireza Taqdiri. 2016. "Fiscal Policy, Inequality and Poverty in Iran: Assessing the Impact and Effectiveness of Taxes and Transfers," Working Paper 1605 (New Orleans: Tulane University, Economic Research Forum, and CEQ Institute).

Fellman, Johan, Markus Jäntti, and Peter J. Lambert. 1999. "Optimal Tax-Transfer Systems and Redistributive Policy." *Scandinavian Journal of Economics* 101, no. 1, pp. 114-126.

Higgins, Sean. 2018. "Producing Indicators and Results, and Completing Sections D and E of CEQ Master Workbook using the CEQ Stata Package." Chapter 8 in Nora Lustig (editor), *Commitment to Equity Handbook. Estimating the Impact of Fiscal Policy on Inequality and Poverty.* Brookings Institution Press and CEQ Institute, Tulane University. Advance online version available at http://www.commitmentoequity.org/publications/handbook.php.

Higgins, Sean, and Nora Lustig. 2016. "Can a Poverty-Reducing and Progressive Tax and Transfer System Hurt the Poor?" *Journal of Development Economics* 122, pp. 63-75.

Lustig, Nora, editor. 2018. *Commitment to Equity Handbook. Estimating the Impact of Fiscal Policy on Inequality and Poverty* (Brookings Institution Press and CEQ Institute, Tulane University). Advance online version available at http://www.commitmentoequity.org/publications/handbook.php.

Lustig, Nora, and Sean Higgins. 2018. "The CEQ Assessment: Measuring the Impact of Fiscal Policy on Inequality and Poverty." Chapter 1 in Nora Lustig (editor), *Commitment to Equity Handbook. Estimating the Impact of Fiscal Policy on Inequality and Poverty.* Brookings Institution Press and CEQ Institute, Tulane University. Advance online version available at http://www.commitmentoequity.org/publications/handbook.php.