

## Curbing leakage in public programmes

### Evidence from India's Direct Benefit Transfer Policy for LPG subsidies



**In brief:**

- Welfare programmes often observe a high rate of leakage of public funds. Many developing countries subsidise access to essential commodities with in-kind transfer programmes, where beneficiaries receive goods at subsidised price while non-beneficiaries have to pay the market price.
- The design of traditional in-kind transfer programmes itself, when it leads to a 'dual pricing' regime, may provide arbitrage incentives to intermediaries to divert and resell subsidised goods to non-beneficiaries
- This brief discusses outcomes of a study evaluating a key policy change aimed at curbing leakages in India's cooking fuel (LPG) subsidy programme. Household LPG is provided at a low, subsidised price to households, while commercial LPG users have to pay a much higher price.
- The findings show that bridging the price gap by transferring subsidies directly to verified beneficiaries reduces the purchase of household LPG by 11-14%. Further, a reduction in diversion of household LPG led to high prices in the black market, confirming the supply shock. Commercial LPG purchases also respond to the shortage of diverted households LPG refills in the black market.
- Further, welfare delivery programmes in developing countries can be made more efficient with policy reforms which can address the economic incentives for corruption and fraud.

*This project was funded by IGC Research Programme*

## Background and motivation

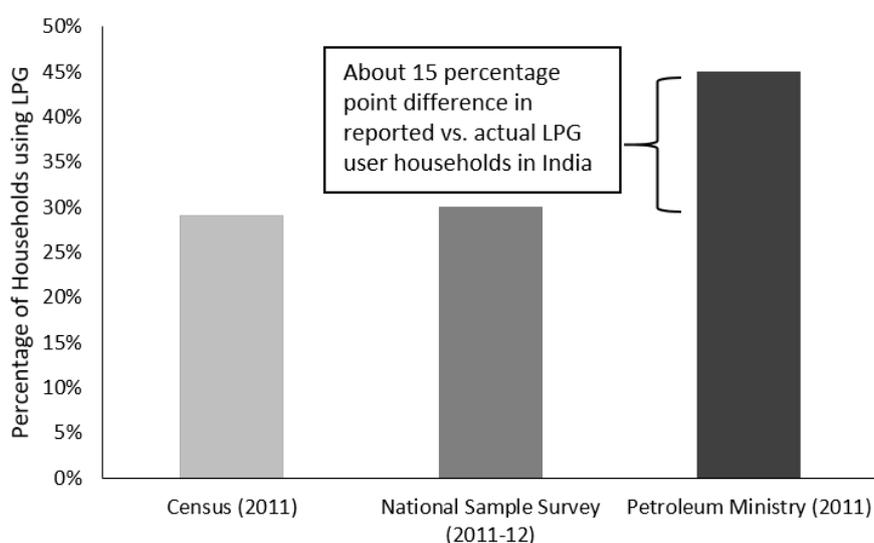
Governments, across the world, run large in-kind transfer programmes to provide essential commodities at subsidised prices. In-kind transfers account for a significant share of social safety net spending in developing countries - Middle East and North Africa (18 percent), Africa (11 percent), South Asia (10 percent), and Latin America and the Caribbean (9 percent) (World Bank 2018). Such programmes are, in general, more visible, and provide a politically appealing social mechanism for redistribution. At the same time, in-kind transfers can be inefficient for a number of reasons, for instance, they may distort consumption at the margin, or such programmes can be regressive if they benefit richer households more (see Cunha and Gavhari 2008). From the broader economic development perspective, such programmes then may impose a significant cost if they crowd out the fiscal space for investments in public goods.

A relatively less studied aspect, which is usually inherent in the design of in-kind transfer programmes, is 'dual-pricing', which provides the key economic incentive for diversion of subsidised goods. This occurs when the state provides subsidised goods at a lower price to programme beneficiaries, while the non-beneficiaries continue to face the market price for the same good. The resulting price gap incentivises intermediary agents to divert the subsidised goods to outside market, often by inflating the beneficiary list. Particularly in settings with high informality, and limited enforcement and monitoring, such arbitrage incentives may aggravate agency problems leading to substantial leakage of public funds.

## LPG subsidy in India

The Government of India runs a large cooking fuel, Liquefied Petroleum Gas (LPG), subsidy programme which illustrates these issues. The government provides LPG to households at a subsidised price, while commercial users pay a much higher tax-inclusive price for the same fuel. During 2013-14, the period of interest in my study (Barnwal 2018), households received LPG at a price about 60% lower, on average, than the commercial price. For a long time, LPG has been a preferred fuel in urban areas, and is primarily used by the middle to upper income groups. In 2013-14, the LPG programme disbursed US \$8 billion to about 150 million beneficiaries.

**Figure 1: Number of reported vs. actual LPG user households**



Perverse economic incentives generated by large price gaps may lead to large number of 'ghost accounts', which provide a conduit to divert subsidised fuel that, in turn, can be sold in black markets and consumed in commercial usage (Fig. 1). Enforcement on ghost accounts or black markets through audits and raids would often fail, as long as such arbitrage incentives continue to exist. The resulting fiscal burden of leakages is a significant concern for policymakers, as captured well by the following headline quote by then finance minister of India in a leading news outlet in 2012 - "Losing sleep over subsidy leakage, not subsidy itself"<sup>1</sup>.

## Direct Benefit Transfer for LPG (DBTL)

India's Direct Benefit Transfer for LPG (DBTL), first launched in 2013, sought to transfer the in-kind subsidies directly to the verified beneficiary households. Before DBTL, households would purchase LPG refills from the government-appointed retailers at the subsidised price. Post-DBTL, households pay the non-subsidised price to purchase LPG from the same retailers, and receive the subsidy amount directly in their bank account after each purchase. Commercial users continue to purchase LPG at a much higher non-subsidised price. Thus, DBTL alters the design of the welfare delivery by bridging the price gap observed by retailers and other intermediary agents in the status quo, but it does not change the core 'in-kind' feature for households in terms of the physical supply of the good or does not replace the 'subsidy per LPG refill' with a 'lump-sum' transfer. To receive the subsidy in their bank account, households are required to provide bank account details and a unique ID ('Aadhaar number') for one-time verification. Households also receive one-time subsidy advance, before making their first LPG refill purchase under DBTL.

In this study, I estimate the impact of DBTL policy on subsidy leakage. I further show complementary evidence from audit surveys in black market and data on commercial LPG purchases.

## Data and methodology

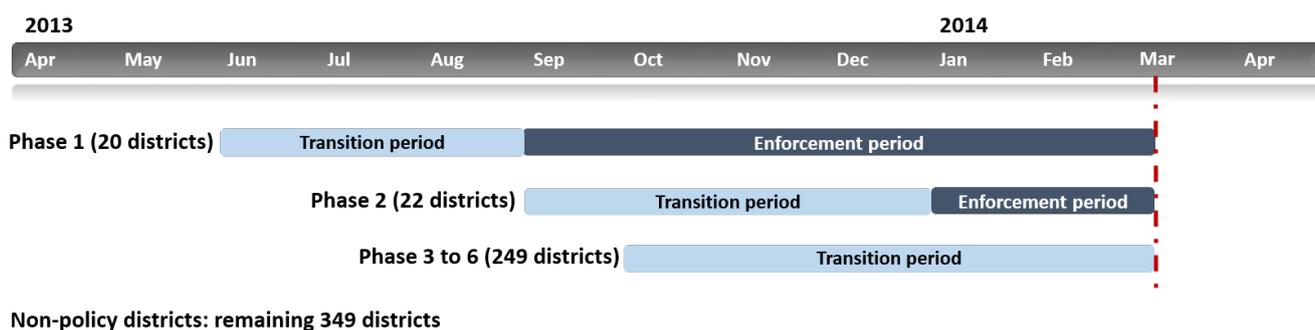
The analysis uses two main datasets – administrative data on cooking fuel sales from one of the three Oil Marketing Companies, and audit surveys in the local black markets. DBTL was first enforced in September 2013 in a group of districts in India, which allows comparing districts in Phase 1 that received the policy earlier to other districts (Phase 3 onwards). The quasi-experimental setting here – i.e. (a) the phasing-in of the policy across districts, and (b) its unexpected termination in early 2014<sup>2</sup>, provides the variation necessary to estimate the policy impact using difference-in-differences methodology (Fig. 3). In other words, the policy implementation and its sudden termination provide us two quasi-experiments which I exploit to study the impact of the policy on household and commercial LPG refills purchase, and black-market prices.

---

<sup>1</sup> <https://www.ndtv.com/business/losing-sleep-over-subsidy-leakage-not-subsidy-itself-pranab-mukherjee-298108> (accessed 15 May 2018).

<sup>2</sup> After 2014 general election, the new government reintroduced the policy across all districts.

**Figure 2: Implementation timeline: Direct benefit transfer for LPG policy**

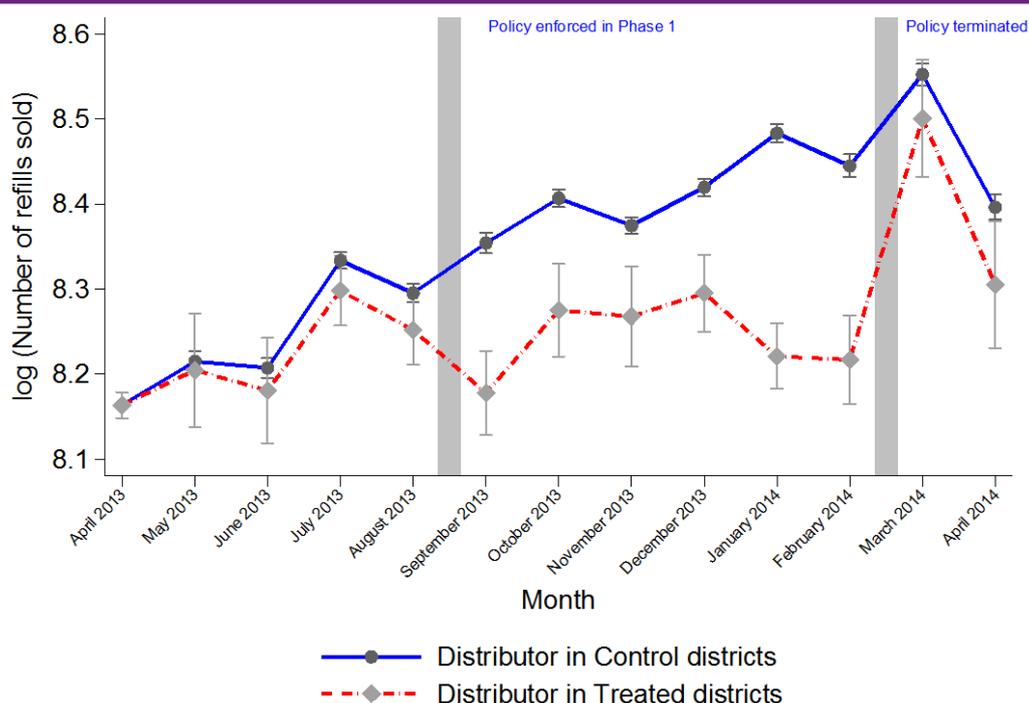


## Research findings

### 1. Fuel sales to households

The DBTL policy reduced household LPG purchase by 11% to 14% (Fig 4). When the DBTL policy was terminated, status quo dual-prices resumed. The results show that, after the policy termination, household fuel purchases in DBTL districts increased quickly.

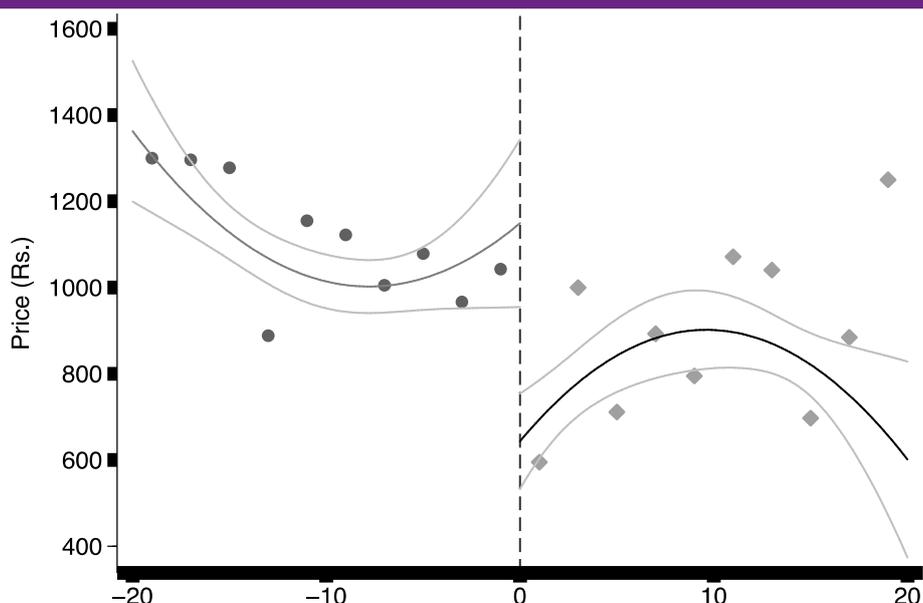
**Figure 3: Implementation timeline: Direct benefit transfer for LPG policy**



### 2. Black market fuel prices

I find evidence on a supply shock in the black market induced by DBTL, which in turn affects the equilibrium price in the black market (Figure 5). Comparing prices in DBTL districts with the same in other districts, I find that the price of diverted LPG refills dropped down by up to 19% in the black market due to the DBTL policy termination.

**Figure 4: DBTL termination reduced black-market prices**



Note: The horizontal axis shows the days relative to policy termination. The vertical axis shows the measured price of a LPG refill in the black market

### 3. Fuel purchase by commercial users

In response to the lower black market prices for LPG, commercial firms reduce their LPG purchases in the formal sector by 6-9%, which suggests that they re-enter the black market for LPG once the policy is terminated.

While collusion between retailers/intermediary agents and households remains a possibility, it would likely be costlier under DBTL. Similar to tax evasion, any difference in re-selling opportunity available to the households over retailers would matter (Kopczuk et al. 2016).

It is important to understand whether DBTL led to exclusion of genuine household beneficiaries and to what extent, such exclusion affects this analysis. My study includes a detailed exploration of the transaction-level administrative data and presents complementary evidences such as impact on the black market prices, which suggest that a nontrivial fraction of subsidies under the status quo were being diverted to black market. Additionally, there is suggestive evidence from a follow up government programme that a significant proportion of richer households voluntarily chose to not enrol in DBTL, and continued to purchase the LPG refills at the non-subsidised price without receiving any subsequent subsidy transfer<sup>3</sup>.

Since 2014, about US \$15 billion has been disbursed in LPG subsidies through DBTL. The potential fiscal savings due to DBTL, using the estimated reduction in diversion of household LPG refills, is likely to be substantial.

<sup>3</sup> A follow up programme “Give It Up” requesting richer households to voluntarily give up their LPG subsidy observed more than 10 million household enrollments.

## Policy recommendations

1. **Transferring subsidies directly to the programme beneficiaries in in-kind transfer programmes can help in reducing leakages.** In general, policy reforms designed to curb leakages in public programmes need to target the underlying economic incentives which may exacerbate the agency problems.
2. **Welfare programmes should be carefully evaluated for how they interact with markets.** Measuring market effects is policy-relevant for large welfare delivery programmes as well as for policy changes which aim to increase efficiency in welfare delivery (see Cunha et al. 2018, Muralidharan et al. 2017 for evidence from other programmes).
3. **The abrupt termination of DBTL itself indicates the importance of political economy challenges with such policy reforms.** Politically connected agents may lobby against and may even succeed in subverting policy reforms when their rents are threatened.

This study provides an opportunity to understand how large-scale in-kind transfer programmes can be redesigned to reduce leakages, and makes a case for similar subsidy reforms in other sectors such as fertilizer and electricity subsidies. Recent studies on improving fund flow in the rural employment programme NREGA with e-governance initiatives and secured payments infrastructure have also documented significant level of leakage reduction in India (Banerjee et al. 2016, Muralidharan et al. 2014). There have been repeated calls for However, it is important to highlight several important features of the LPG subsidy programme which allow us to focus on the core outcomes in this analysis – e.g., LPG is a homogenous commodity with little quality variation, primarily used by middle-to-upper income and mostly urban households during the study period, and importantly, the subsidy transfer amount is pegged to the LPG price to shield households from price variations. A more cautious approach is needed when policy-makers consider implementing the direct benefit transfer policy in other contexts – for instance, in programmes where the consumption commodities are too complex, majority of beneficiaries have limited access to banking services, the transfer amount is not large enough.

## References

Banerjee, A, E Duflo, C Imbert, S Mathew and R Pande (2016), “E-governance, accountability, and leakage in public programmes: Experimental evidence from a financial management reform in India”, Working Paper No. w22803, *National Bureau of Economic Research*.

Barnwal, P (2018), “[Curbing leakage in public programmes: Evidence from India's Direct Benefit Transfer Policy](https://www.dropbox.com/s/vqhp7cx4exav/DBTLLeakage.pdf?dl=0)”, Working Paper. URL: <https://www.dropbox.com/s/vqhp7cx4exav/DBTLLeakage.pdf?dl=0>

Cunha, J, G De Giorgi and S Jayachandran (2018), “The price effects of cash versus in-kind transfers”. *Review of Economic Studies*.

Currie, J and F Gahvari (2008), “Transfers in cash and in-kind: Theory meets the data” *Journal of Economic Literature*, 46(2), 333-83.

Kopczuk, W, J Marion, E Muehlegger, and J Slemrod (2016), “Does tax-collection invariance hold? Evasion and the pass-through of state diesel taxes”, *American Economic Journal: Economic Policy*, 8(2), 251-86.

Muralidharan, K, P Niehaus and S Sukhtankar (2016), “Building state capacity: Evidence from biometric smartcards in India”, *American Economic Review*, 106 (10), 2895-2929.

Muralidharan, K, P Niehaus and S Sukhtankar (2017), “General equilibrium effects of (improving) public employment programmes: Experimental evidence from India”, Working Paper No. w23838, *National Bureau of Economic Research*.

World Bank. 2018. *The State of Social Safety Nets 2018*. Washington, DC: World Bank.