

The reliability of unsold fresh food as a source for redistribution

A case study by simulation comparing retail outlets by size and inventory level using data from British supermarkets

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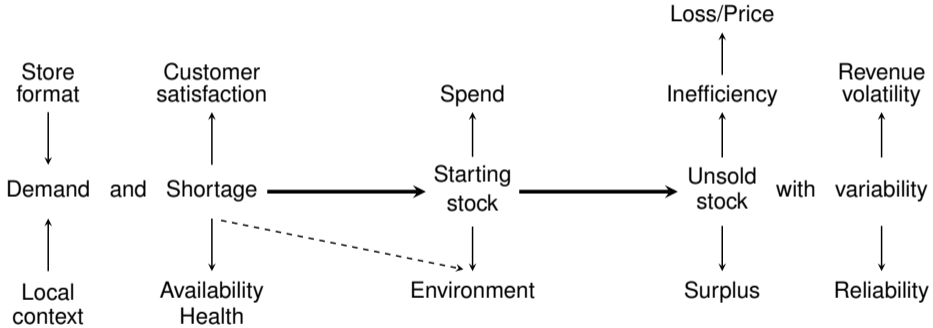
Demand uncertainty in local catchment areas leads to

- surplus with fluctuation
- business ...outcomes
- environmental
- health

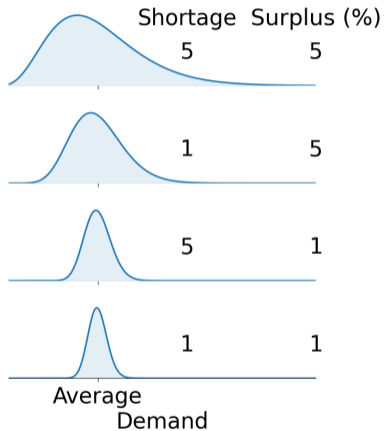
At what scale, and under what availability for purchase, is surplus for redistribution a reliable source?

Conceptual framework

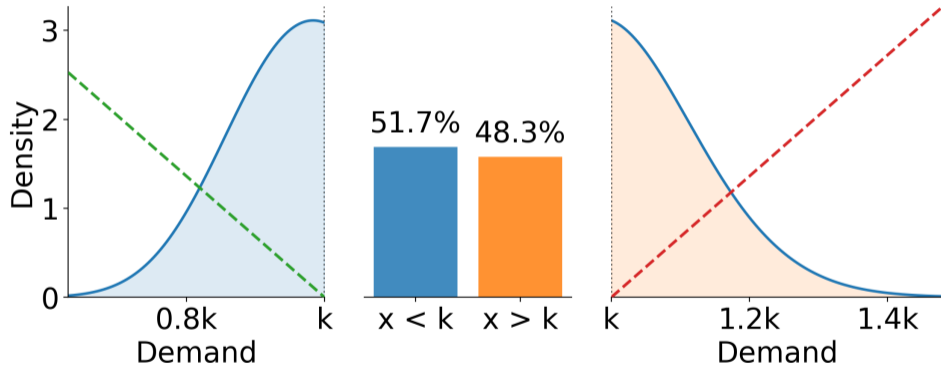
Pathways from demand uncertainty to outcomes



1-day demand distribution, shortage, and surplus (%)

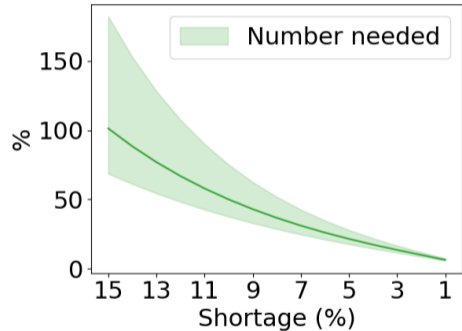
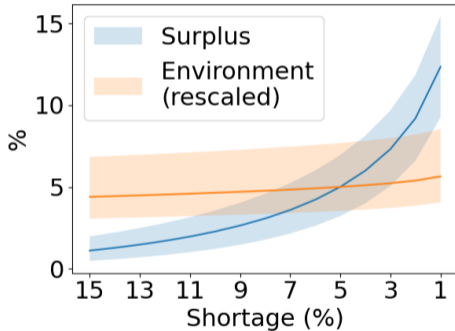


1-day demand (x), starting stock (k), and surplus



Consequences of shortage

For a 1-day demand distribution which has 5% surplus when there is 5% shortage:



“Number needed” is the number of similar units **pooled** needed to provide surplus with a coefficient of variation of 0.3, a “reliable” provision.

Estimates for 5% shortage, 5% surplus

Shelf-life (first (last) in, first out)

	1 day		2 day (FIFO)		2 day (LIFO)	
Number needed	22	(18 to 28)	95	(77 to 112)	52	(52 to 53)
Log-sensitivity to availability (%)						
Number needed	-20	(-23 to -18)	-18	(-11 to -28)	-20	(-21 to -19)
Environment	1.9	(1.7 to 2.1)	5.1	(4.1 to 6.4)	2.8	(2.8 to 2.8)
Sensitivity to availability (%)						
Surplus	0.89	(0.69 to 1.07)	1.3	(1.2 to 1.5)	0.81	(0.79 to 0.82)

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