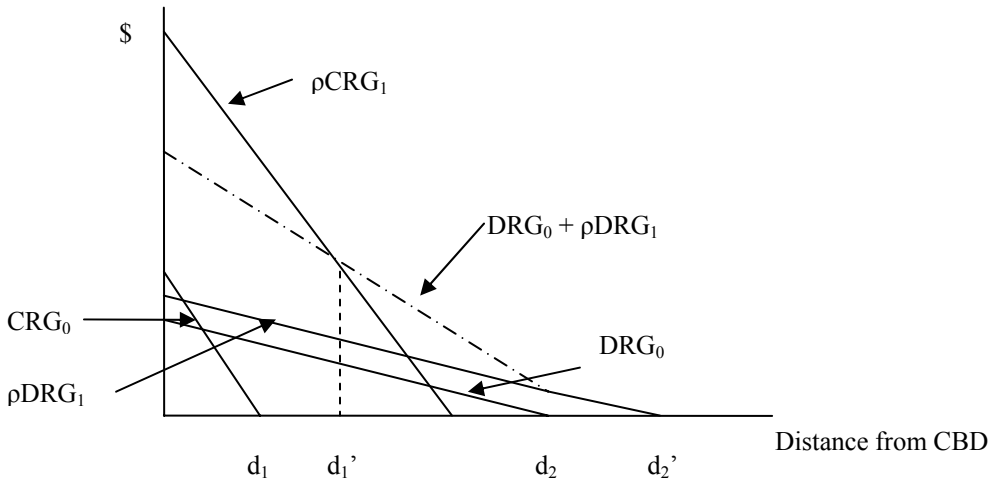


### Supplement to Notes from 10/16

This is a quick supplement regarding the notes on Mills' hypothesis around urban sprawl. This is for the deterministic case, where future rents are known. Suppose we have 2 land uses, commercial and domestic, and a two-period model. In Mills' model, the commercial and domestic rent gradients (CRG and DRG) increase from period 0 to period 1, such that  $CRG_0 < CRG_1$  and  $DRG_0 < DRG_1$ . We can depict this graphically as follows:



Where we have the following development patterns:

	t=0	t=1
0 → d <sub>1</sub>	Commercial	Commercial
d <sub>1</sub> → d <sub>1</sub> '	Vacant	Commercial
d <sub>1</sub> ' → d <sub>2</sub>	Domestic	Domestic
d <sub>2</sub> → d <sub>2</sub> '	Vacant	Domestic

Here's some intuition.

- Land between 0 and d<sub>1</sub> will be developed commercially in period 0 because the two-period sum of commercial rents exceeds the two-period sum of domestic rents for all parcels in this region, and because commercial rents are greater than zero.
- Land between d<sub>1</sub> and d<sub>1</sub>' will be withheld from development in period 0 because i)  $CRG_0 = 0$  in time 0, ii)  $\rho CRG_1 > DRG_0 + \rho DRG_1$ , and iii) domestic development is irreversible.
- Land between d<sub>1</sub>' and d<sub>2</sub> will be developed domestically in period 0 because the two-period sum of domestic rents exceeds the two-period sum of commercial rents for all parcels in this region, and because domestic rents are greater than zero.
- Land between d<sub>2</sub> and d<sub>2</sub>' won't be developed domestically until period 1 because domestic rents don't become positive until period 1.