



Comparative Statics Slutsky Equation




Perbandingan Statis

- Perbandingan 2 kondisi ekuilibrium yang terbentuk dari perbedaan nilai parameter dan variabel eksogen
- Contoh: Perbandingan 2 keputusan konsumen (consumer's behaviour) dengan perubahan harga



- Secara umum, harga dan jumlah permintaan berbanding terbalik.
- Artinya, jika harga naik maka permintaan akan turun.
- Tetapi ternyata ada permintaannya yang jumlahnya menurun dengan menurunnya harga barang tersebut, yang dikenal dengan GIFFEN GOOD



Slutsky's Identity

- Let $x_i(p_i, m)$ be consumer's demand for good i when price of good i is p_i and income is m holding other prices constant

Similarly for $x_i(p'_i, m)$

- If the price of good i changes from p_i to p'_i
- Total change in demand denoted by

$$\Delta x_i = x_i(p'_i, m) - x_i(p_i, m)$$

Slutsky's Identity

- Now let m' be the new level of income such that the consumer is just able to buy the original bundle of goods

- Total change in demand

$$\Delta x_i = x_i(p'_i, m) - x_i(p_i, m)$$


can be rewritten as

$$\Delta x_i = [x_i(p'_i, m') - x_i(p_i, m)] + [x_i(p'_i, m) - x_i(p'_i, m')]$$

or denote

$$\Delta x_i = \Delta x_i^s + \Delta x_i^n$$

where $\Delta x_i^s =$ **substitution effect** and $\Delta x_i^n =$ **income effect**




Slutsky's Identity

- Note that $\mathbf{m}' - \mathbf{m}$ is the amount of the change in money income such that the consumer is just able to buy the original bundle of goods (i.e. purchasing power is constant)
- Denote $\Delta \mathbf{m} = \mathbf{m}' - \mathbf{m}$ and $\Delta \mathbf{p}_i = \mathbf{p}'_i - \mathbf{p}_i$

$$\Delta \mathbf{m} = \Delta \mathbf{p}_i \mathbf{x}_i(\mathbf{p}_i, \mathbf{m})$$

This is the amount of money that should be given to the consumer to hold purchasing power constant



Slutsky's Identity

- In terms of the rates of change, we can write Slutsky's Identity as

$$\frac{\Delta \mathbf{x}_i}{\Delta \mathbf{p}_i} = \frac{\Delta \mathbf{x}_i^s}{\Delta \mathbf{p}_i} - \frac{\Delta \mathbf{x}_i^m}{\Delta \mathbf{m}} \mathbf{x}_i(\mathbf{p}_i, \mathbf{m})$$

where $\Delta \mathbf{x}_i^n = -\Delta \mathbf{x}_i^m$



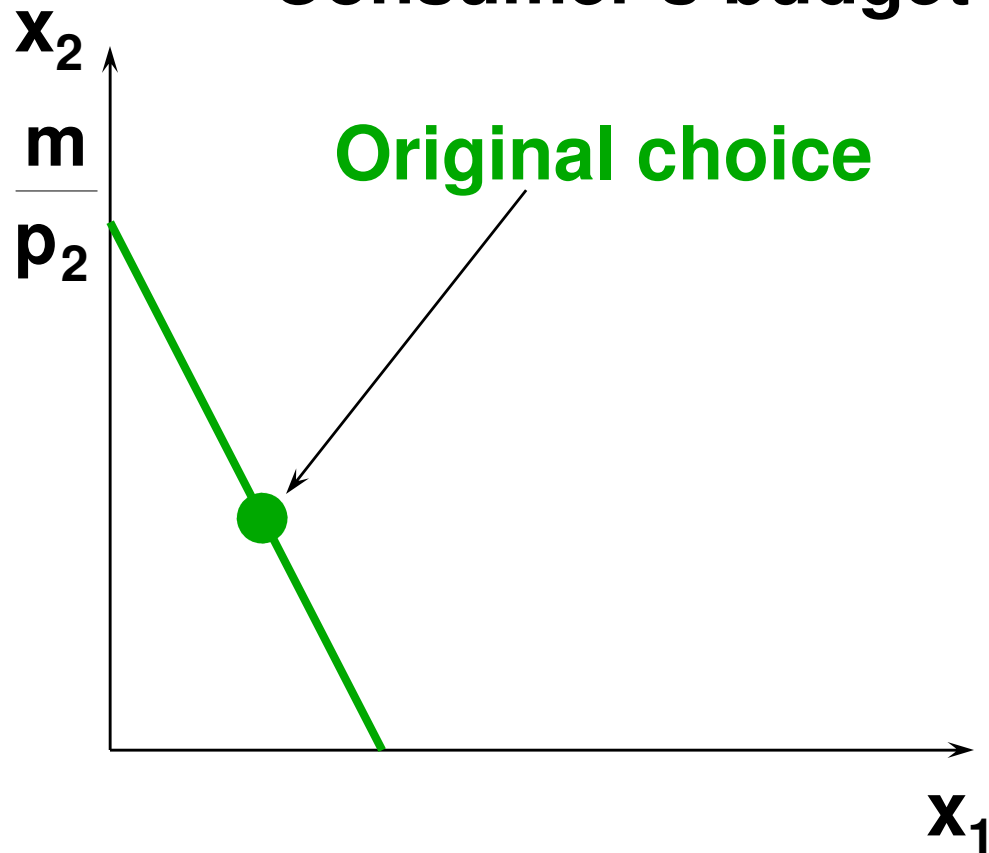
Dampak Perubahan Harga

- Apa yang terjadi jika harga satu barang turun?
 - **Efek Substitusi**: barang tersebut menjadi relatif murah. Konsumen akan meningkatkan konsumsinya terhadap barang yang menjadi relatif murah.
 - **Efek Pendapatan (Income effect)**: Dengan budget yang tetap, konsumen dapat mengkonsumsi lebih banyak barang, seolah-olah pendapatnya meningkat.
- Dan sebaliknya (Vice versa) untuk kenaikan harga

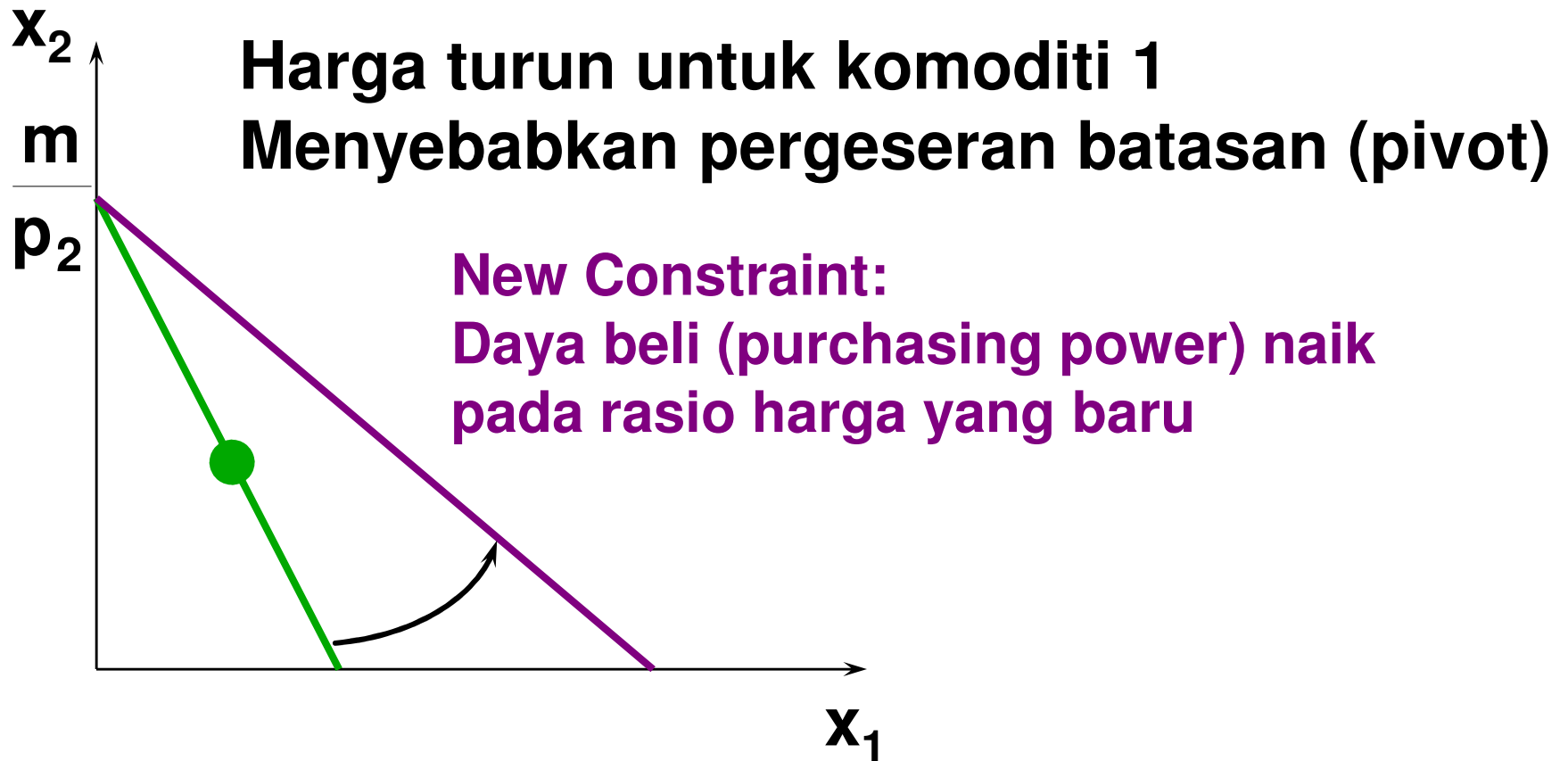


Effects of a Price Change

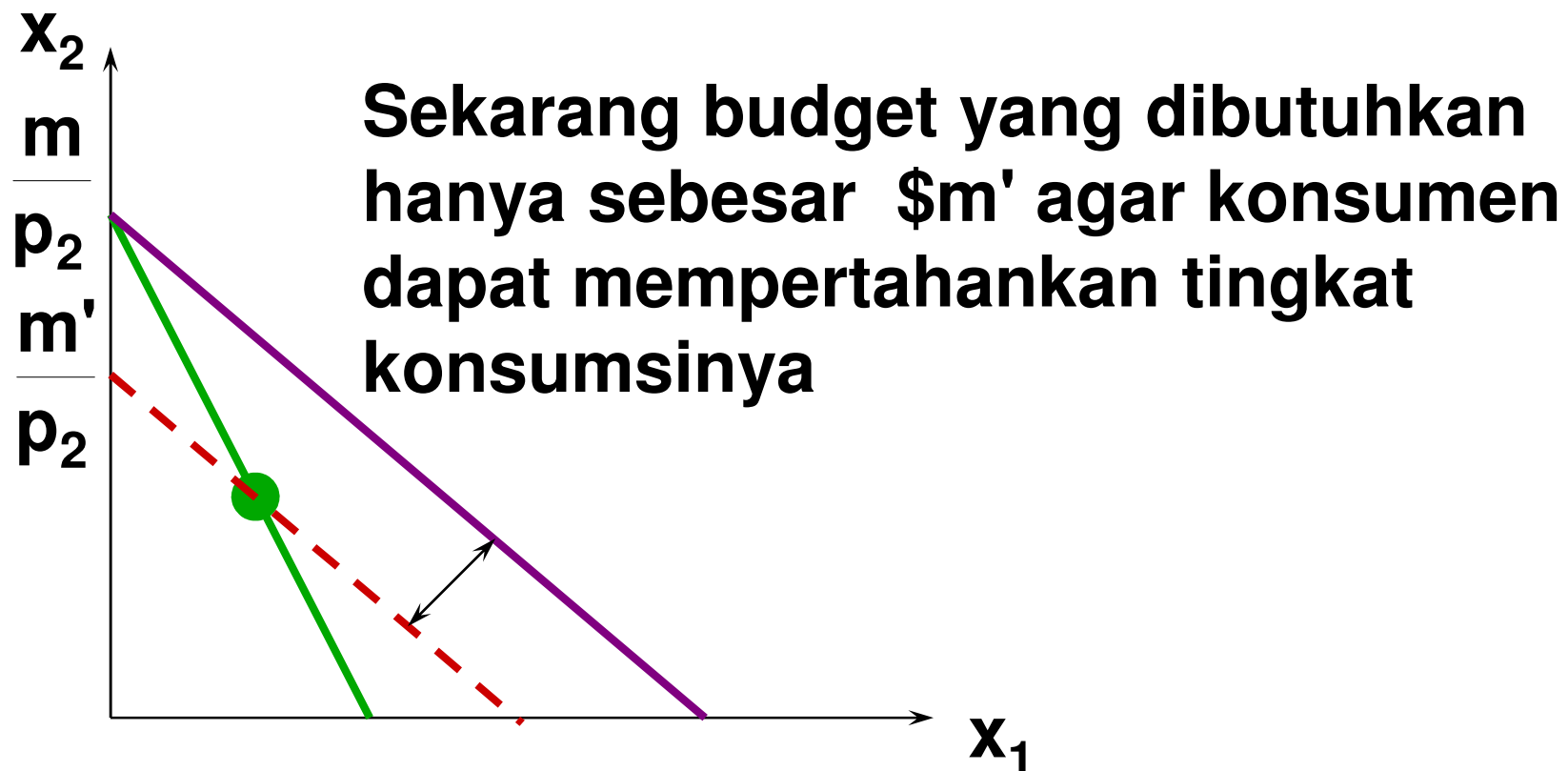
Consumer's budget is \$m.



Effects of a Price Change



Effects of a Price Change



Imagined Constraint: Income is adjusted to keep purchasing power constant



Effects of a Price Change

- Perubahan jumlah permintaan akibat perubahan 'extra' income ($\$m - \m') merupakan income effect akibat perubahan harga.
- Slutsky menemukan bahwa perubahan jumlah permintaan selalu merupakan penjumlahan dari *pure substitution effect* dan *income effect*.

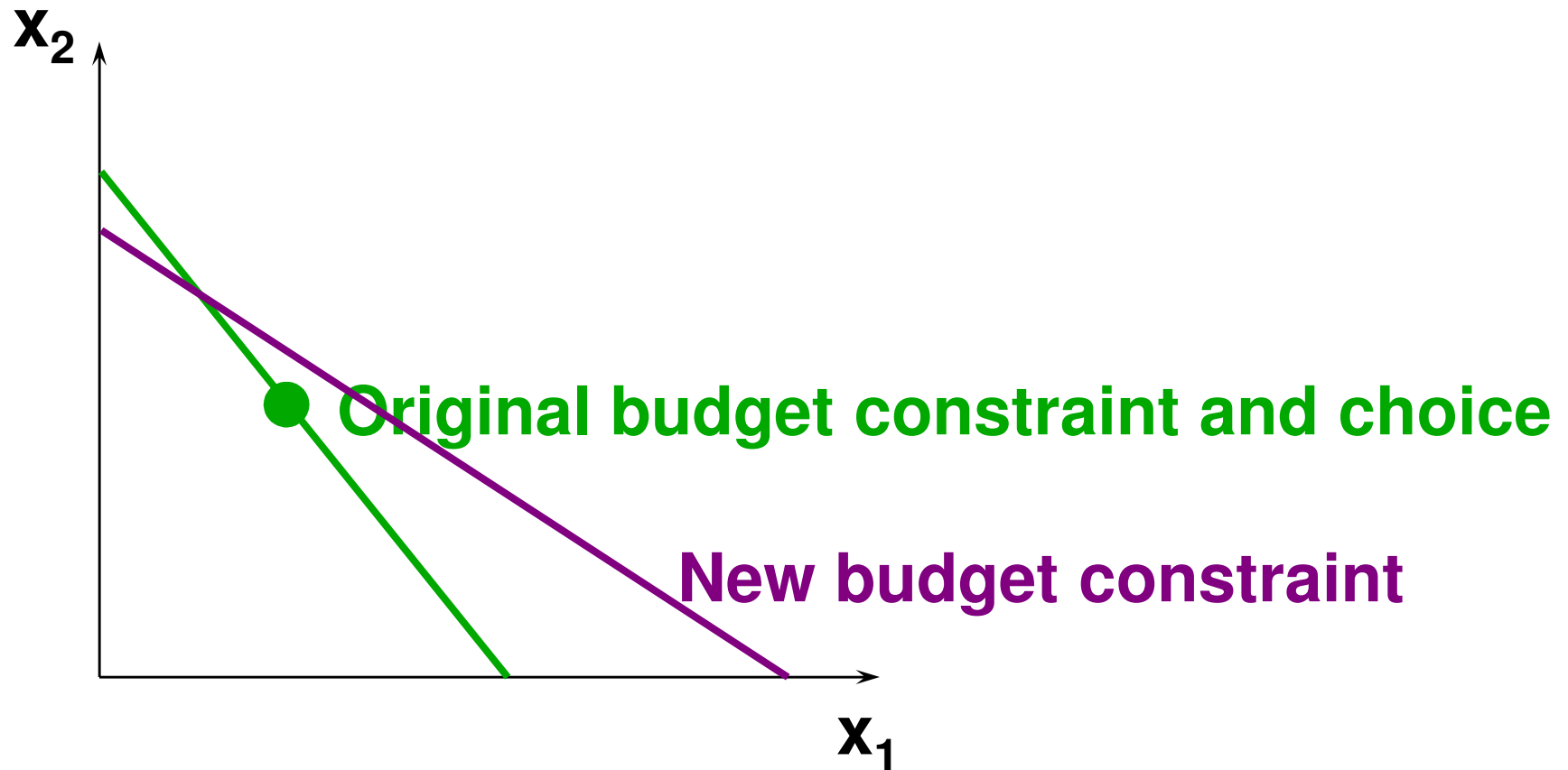


Real Income Changes

- Menurut Slutsky pada harga yang baru,
 - less income is needed to buy the original bundle then “real income” is increased
 - more income is needed to buy the original bundle then “real income” is decreased

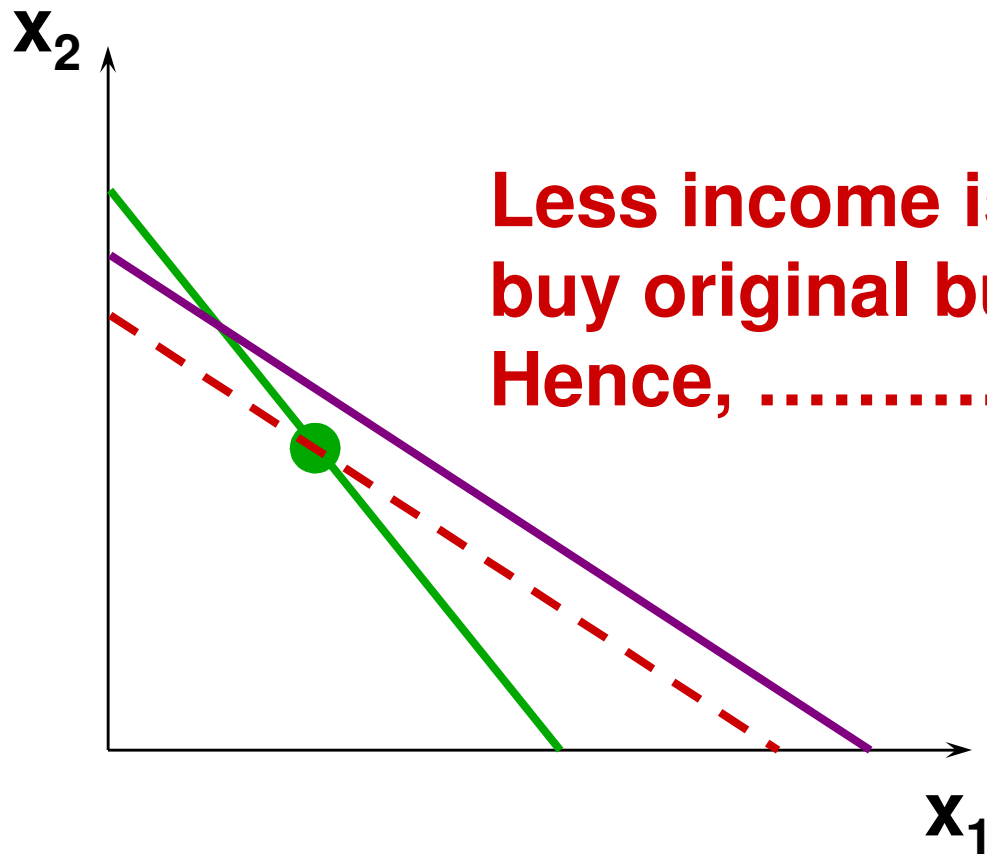


Real Income Changes





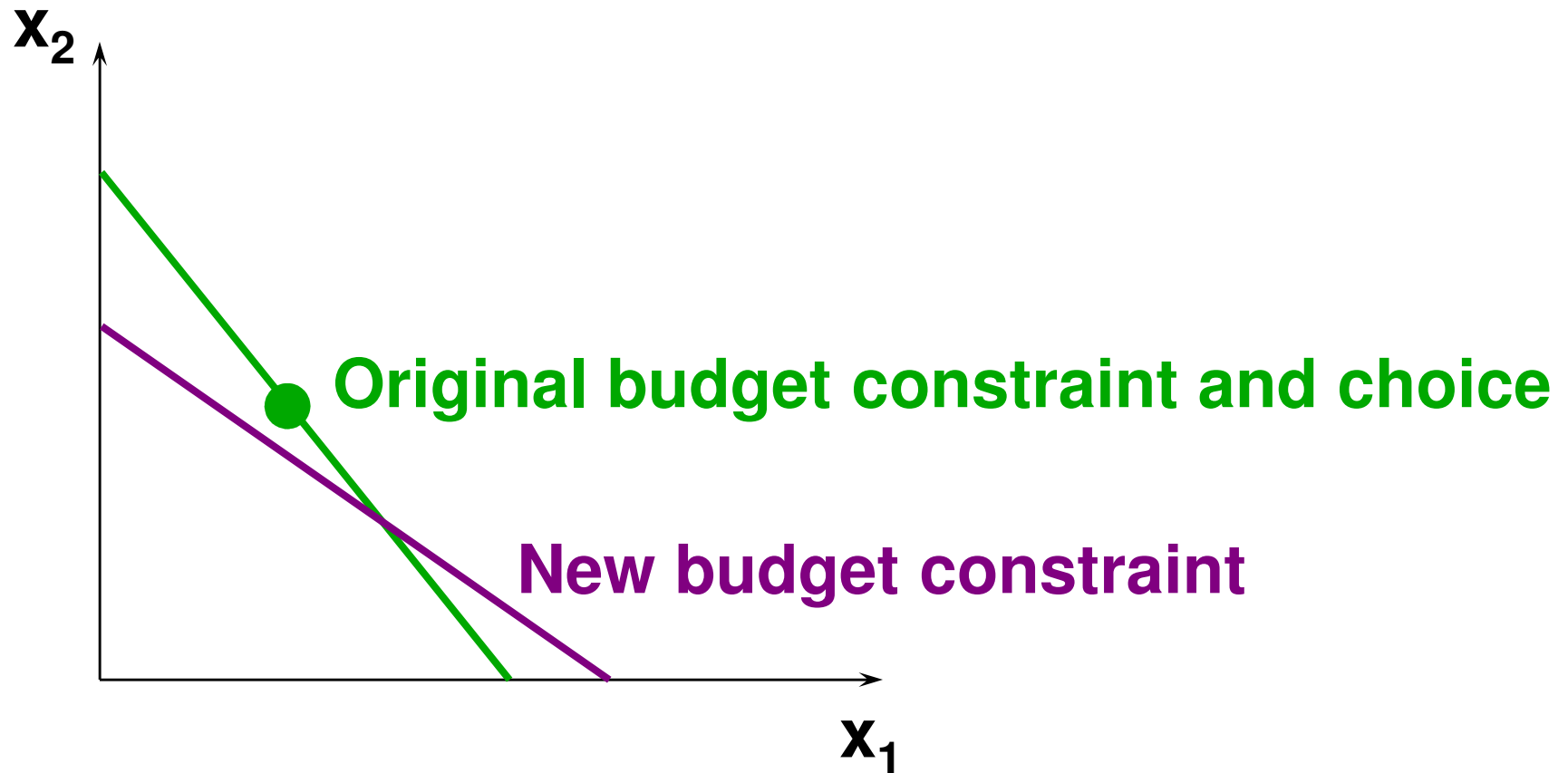
Real Income Changes



**Less income is needed to
buy original bundle.
Hence,**

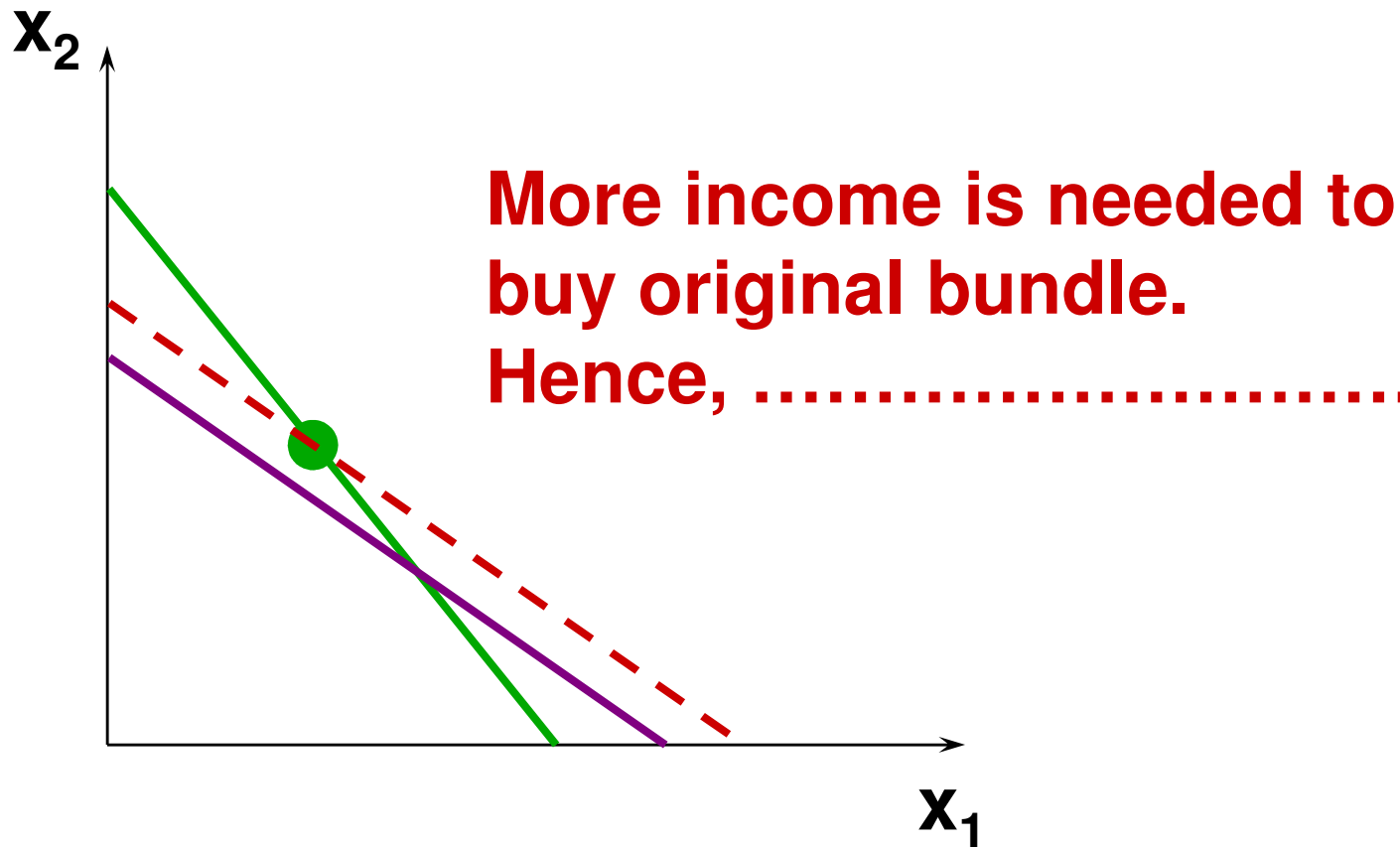


Real Income Changes





Real Income Changes





Real Income Changes

- Absence of Money illusion

If money income and prices increase (or decrease) by the same proportion, e.g. double

→ budget constraint and consumer's choice remain unchanged

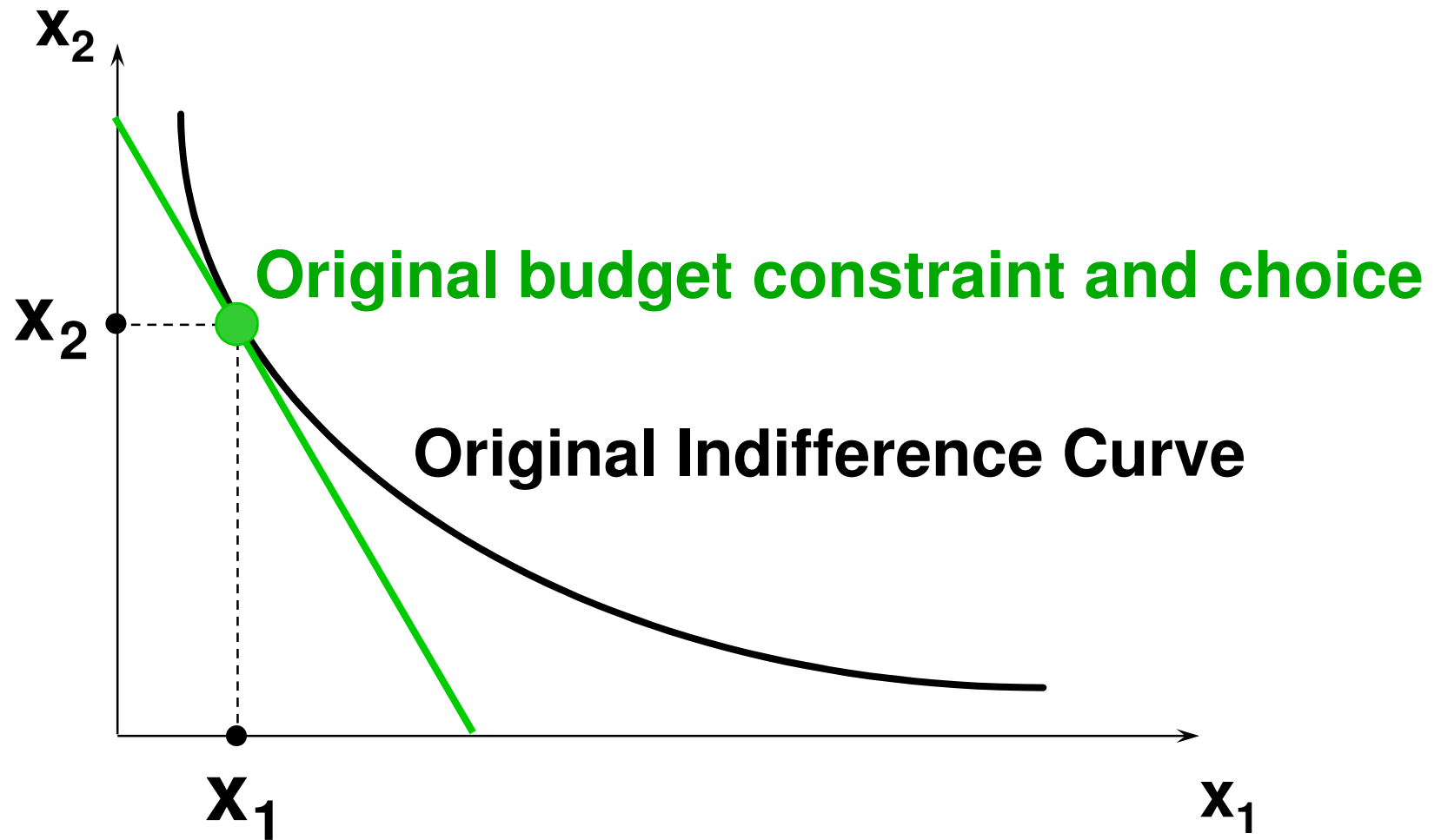


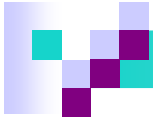
Pure Substitution Effect

- Slutsky isolated the change in demand due only to the change in relative prices by asking “What is the change in demand when the consumer’s income is adjusted so that, at the new prices, she can only just buy the original bundle?”

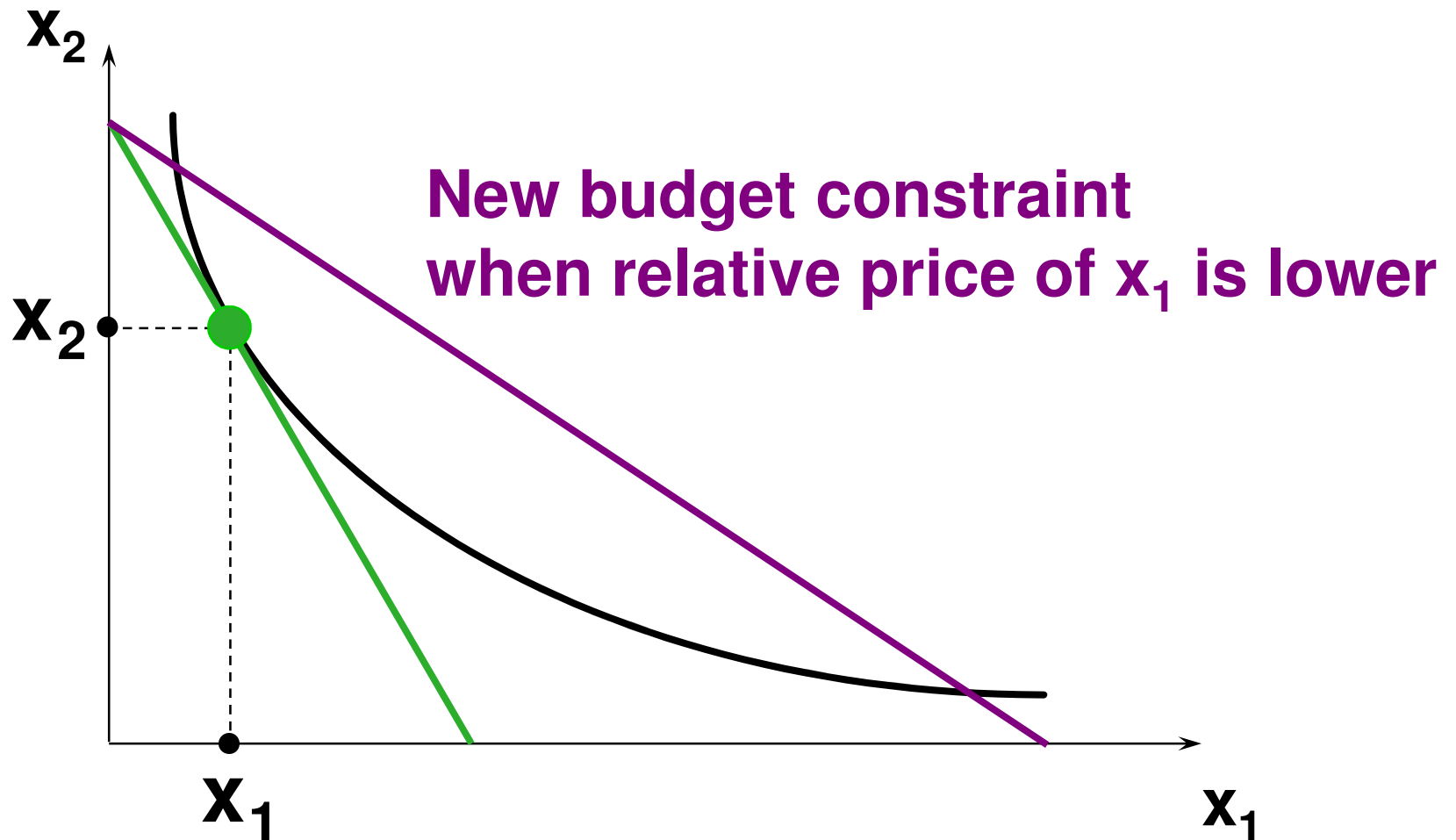


Budget Constraints and Choices



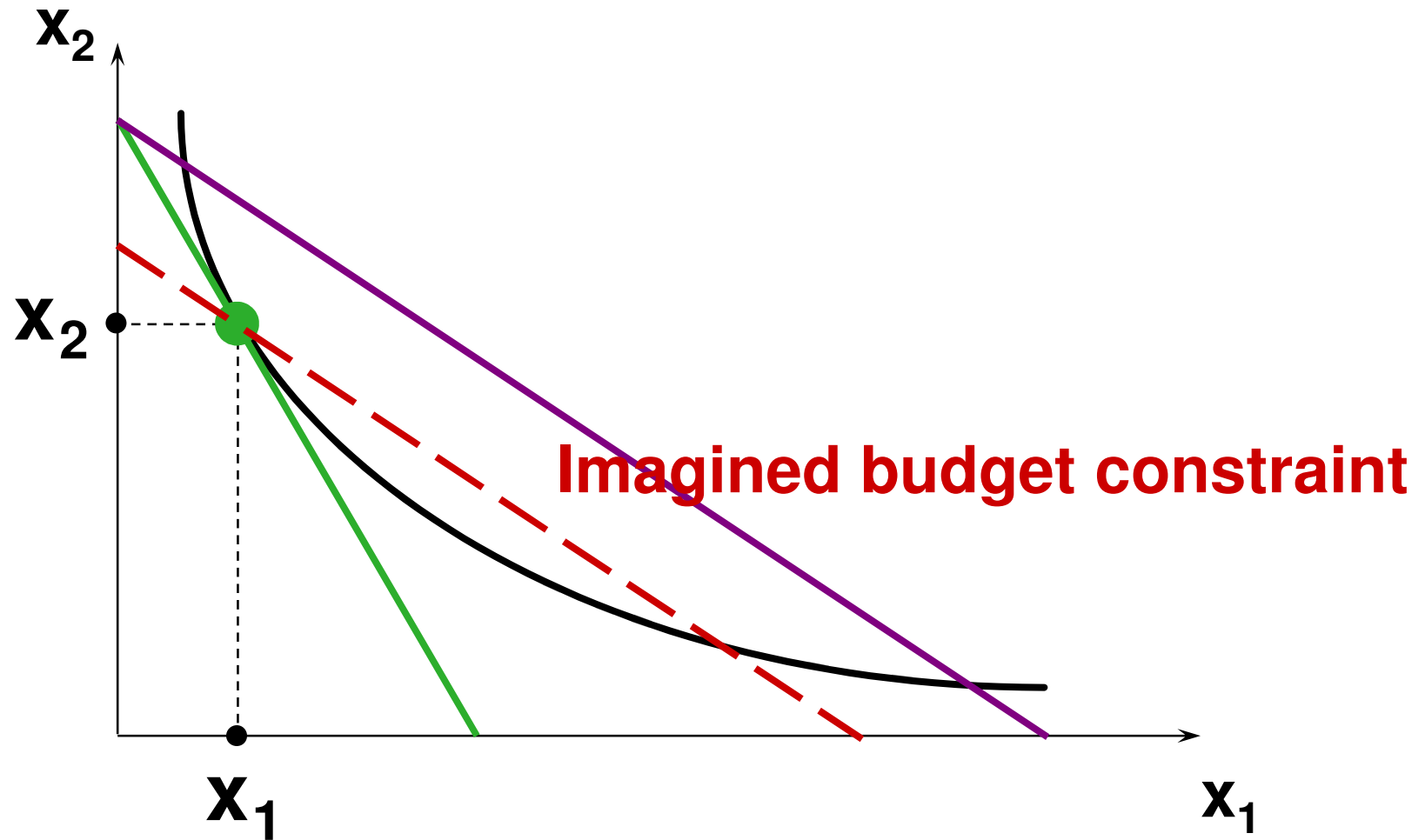


Budget Constraints and Choices



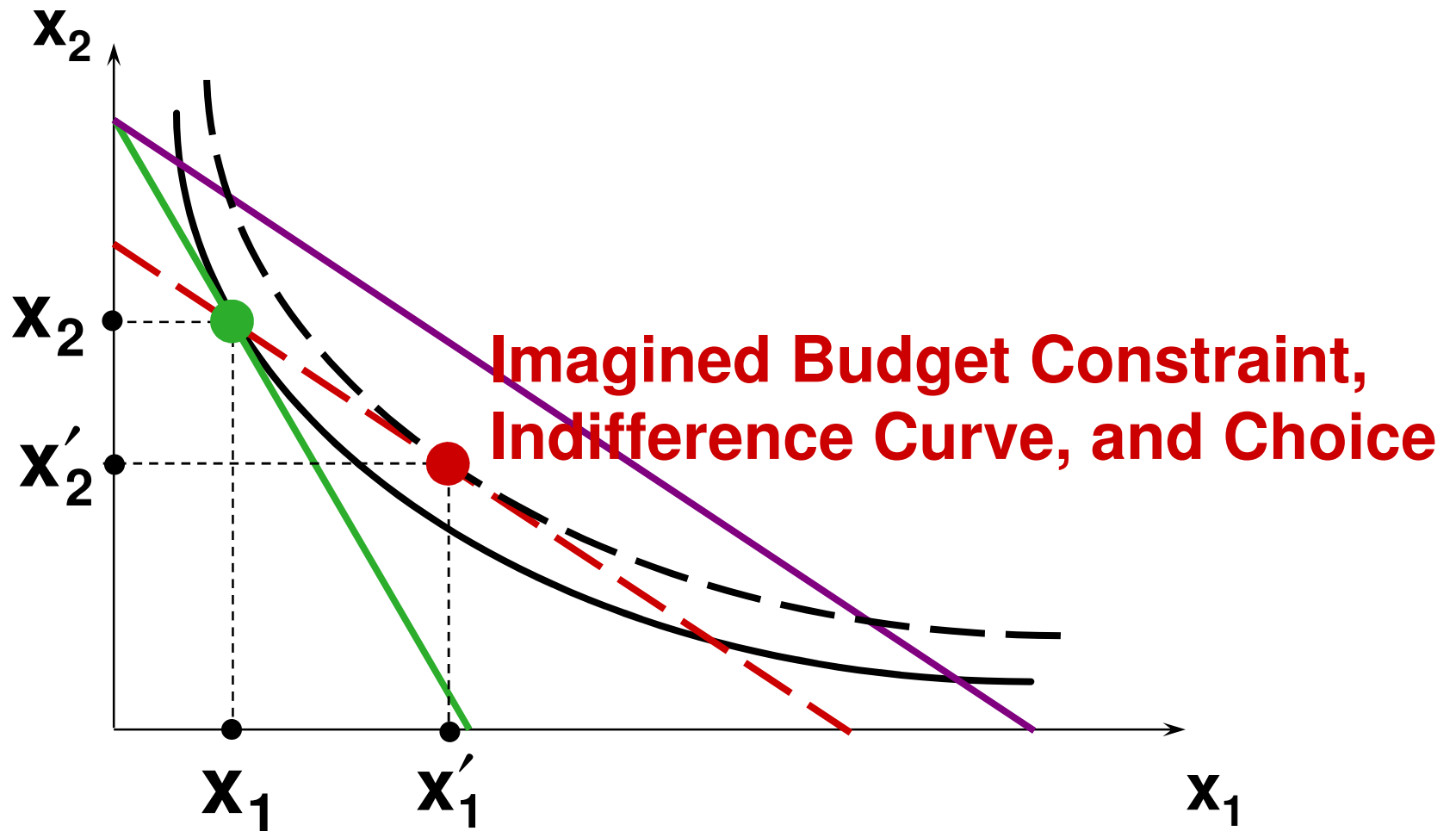


Budget Constraints and Choices

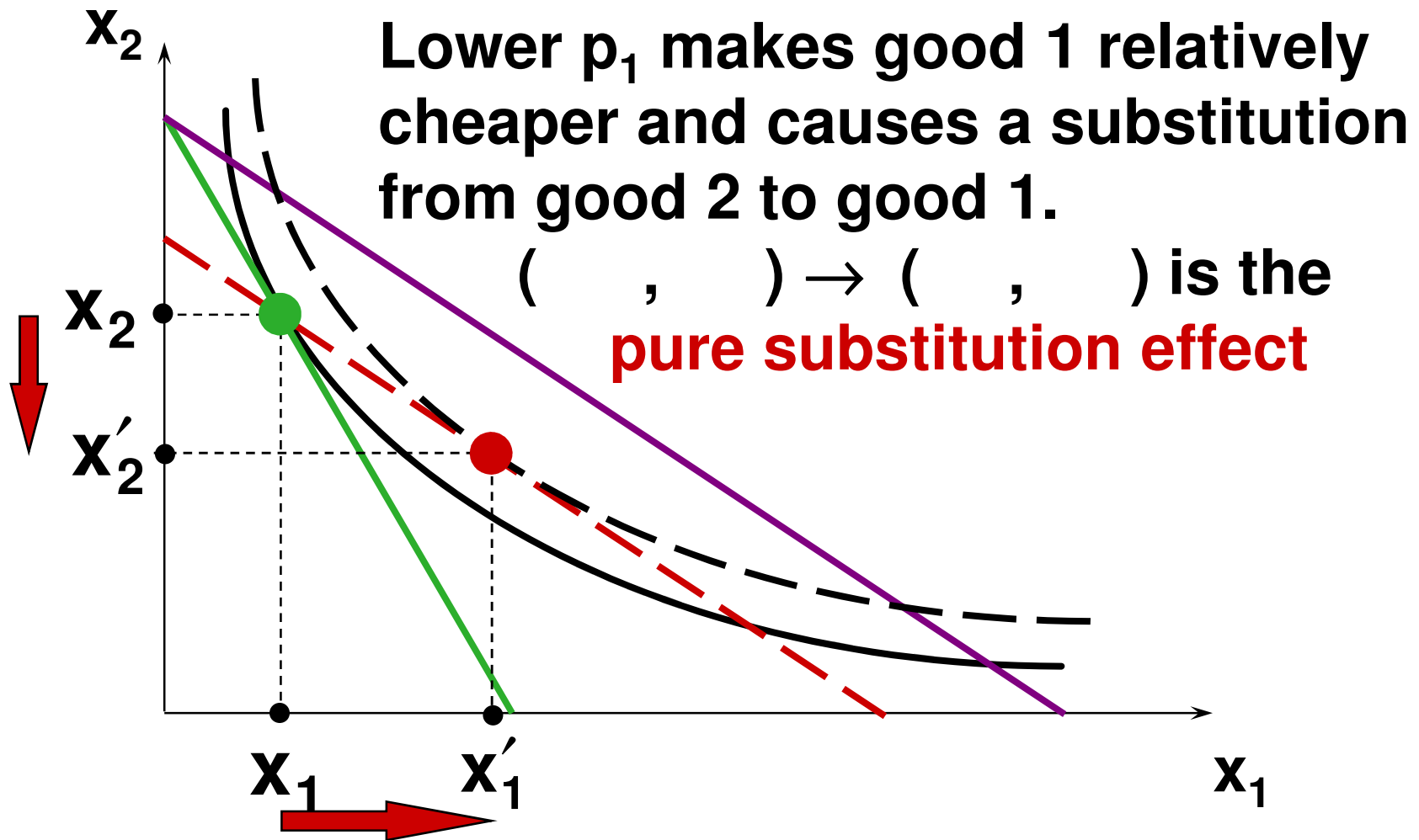




Budget Constraints and Choices

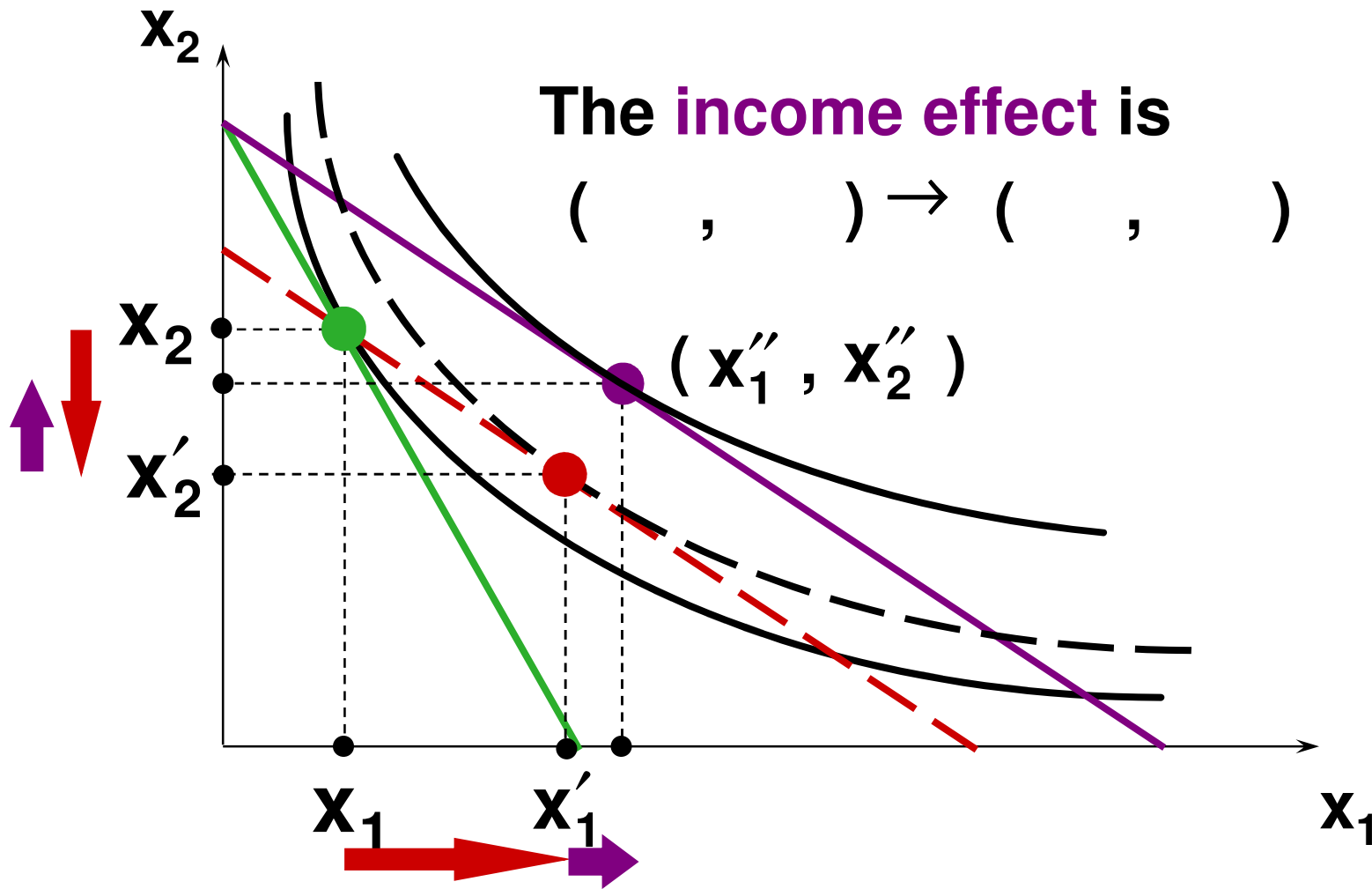


Efek Substitusi (*bundle yang sama*)



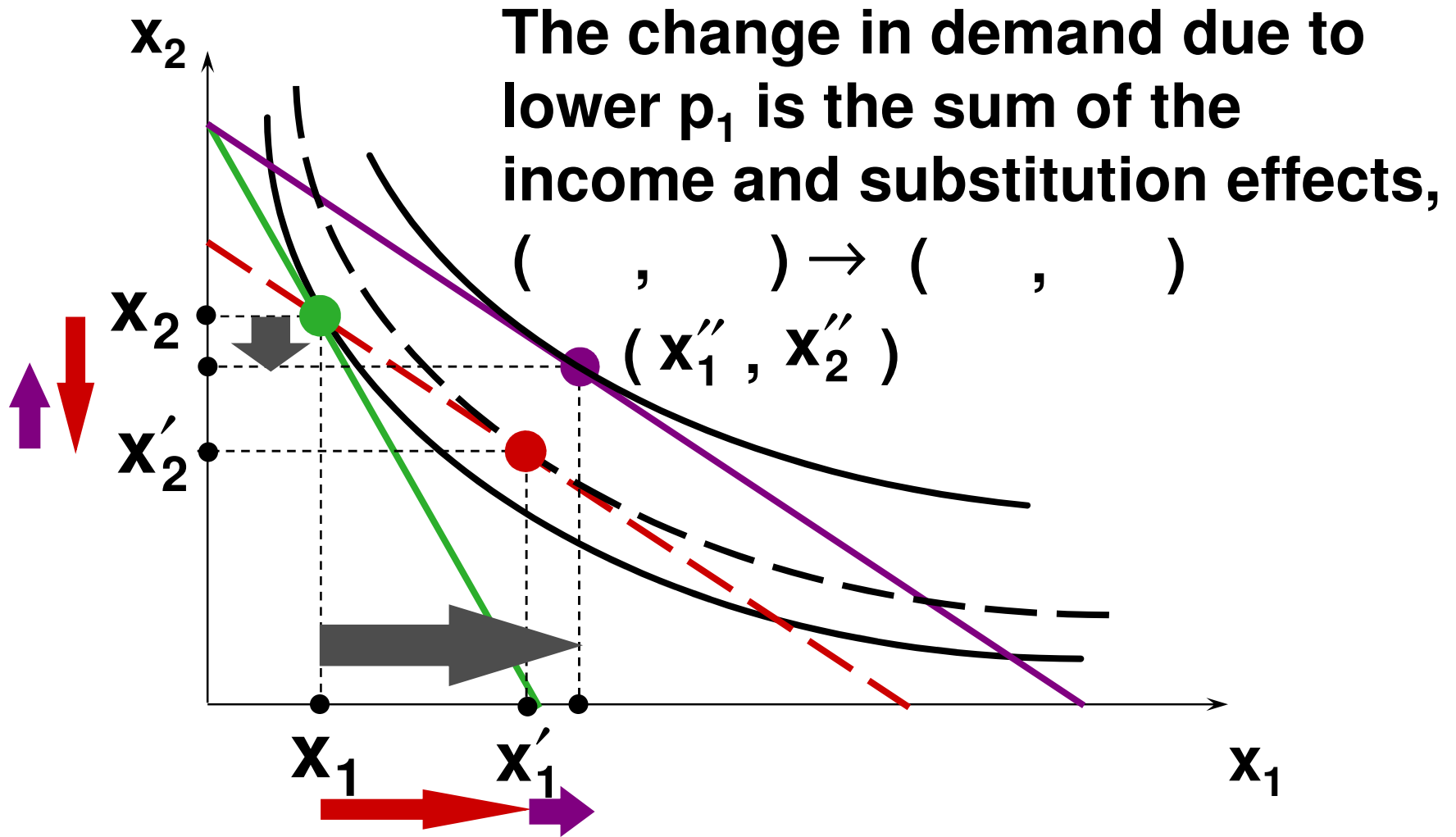


The Income Effect (bundle beda)





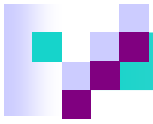
Total Effect



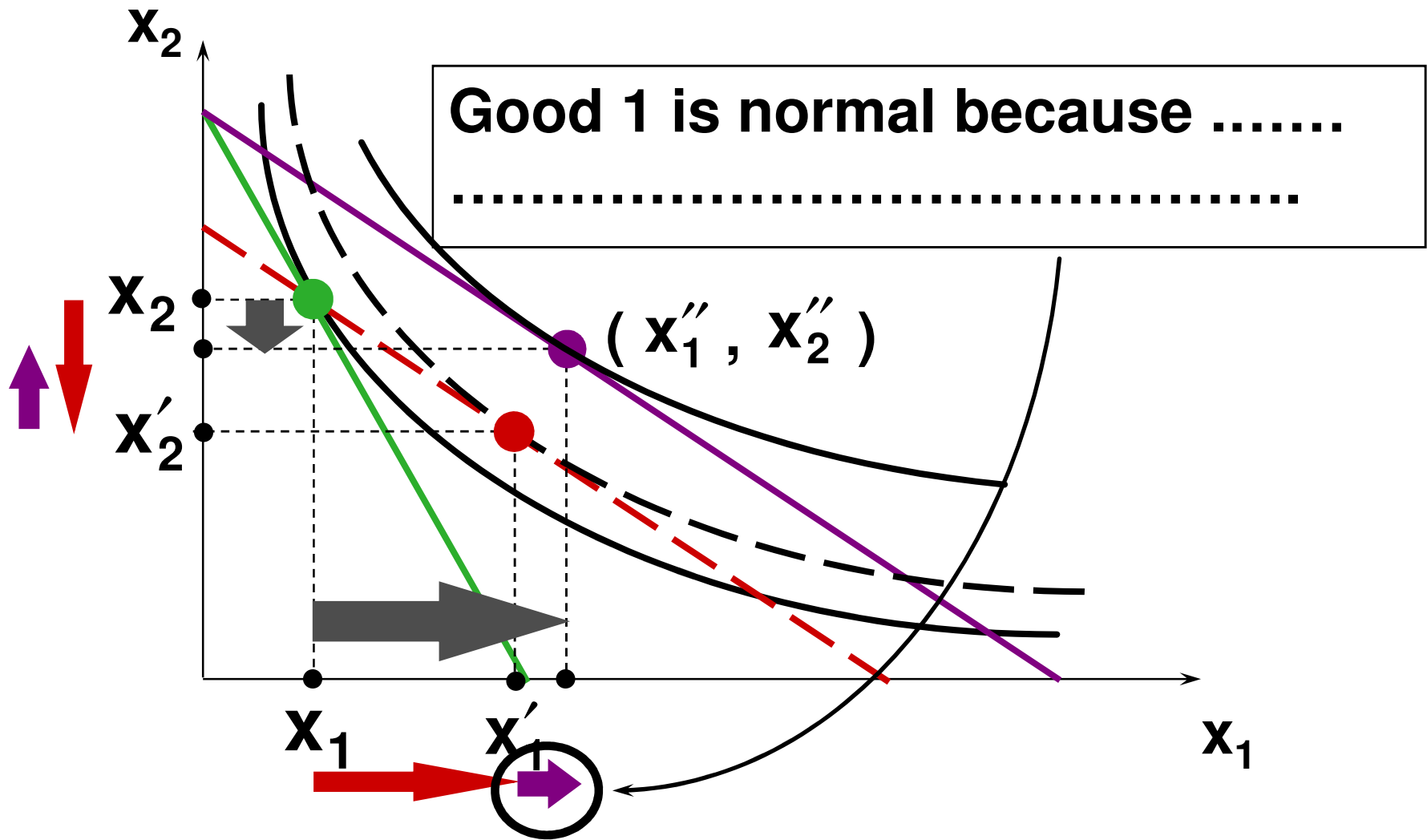


Slutsky's Effects for Normal Goods

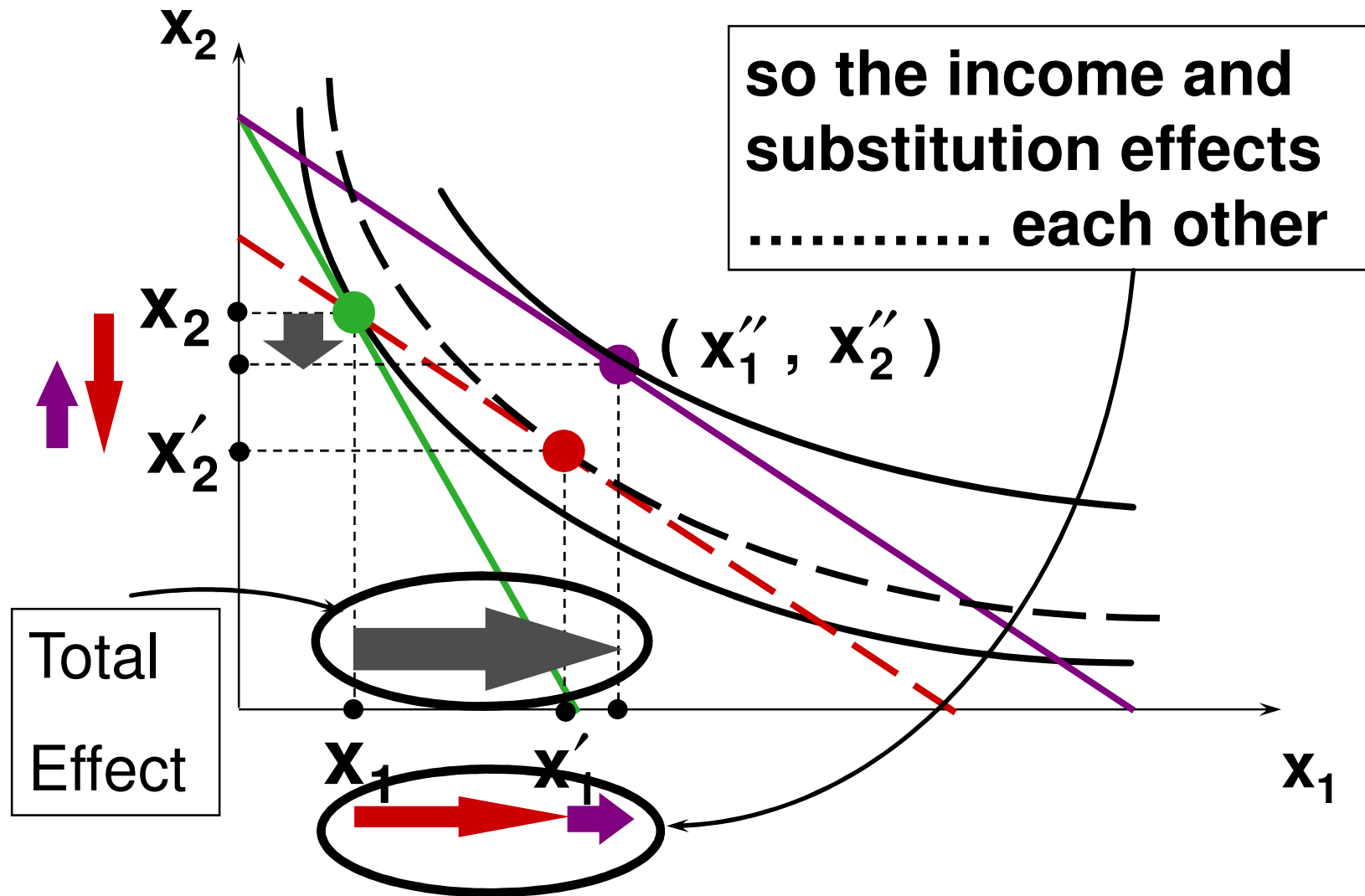
- Umumnya barang bersifat normal (i.e. demand naik dengan pertambahan income).
- The substitution and income effects reinforce each other when a normal good's own price changes.



Slutsky's Effects for Normal Goods



Slutsky's Effects for Normal Goods



Slutsky's Effects for Normal Goods

- When p_i decreases, Δp_i is negative (—)

$$\Delta p_i \rightarrow \Delta x_i = \Delta x_i^s + \Delta x_i^n$$

(—) () () ()

both substitution and income effects
increase demand when own-price falls.

- Alternatively,

$$\frac{\Delta x_i}{\Delta p_i} = \frac{\Delta x_i^s}{\Delta p_i} - \frac{\Delta x_i^m}{\Delta m} x_i(p_i, m)$$

() () () x ()

Slutsky's Effects for Normal Goods

- When p_i decreases, Δp_i is positive (+)

$$\Delta p_i \rightarrow \Delta x_i = \Delta x_i^s + \Delta x_i^n$$

(+) () () ()

both substitution and income effects
decrease demand when own-price rises.

- Alternatively,

$$\frac{\Delta x_i}{\Delta p_i} = \frac{\Delta x_i^s}{\Delta p_i} - \frac{\Delta x_i^m}{\Delta m} x_i(p_i, m)$$

() () () x ()



Slutsky's Effects for Normal Goods

- In both cases, a change in own price results in an opposite change in demand

$$\frac{\Delta \mathbf{x}_i}{\Delta \mathbf{p}_i} \text{ is always.....}$$

→ a normal good's ordinary demand curve slopes down.

- The Law of Downward-Sloping Demand therefore always applies to normal goods.

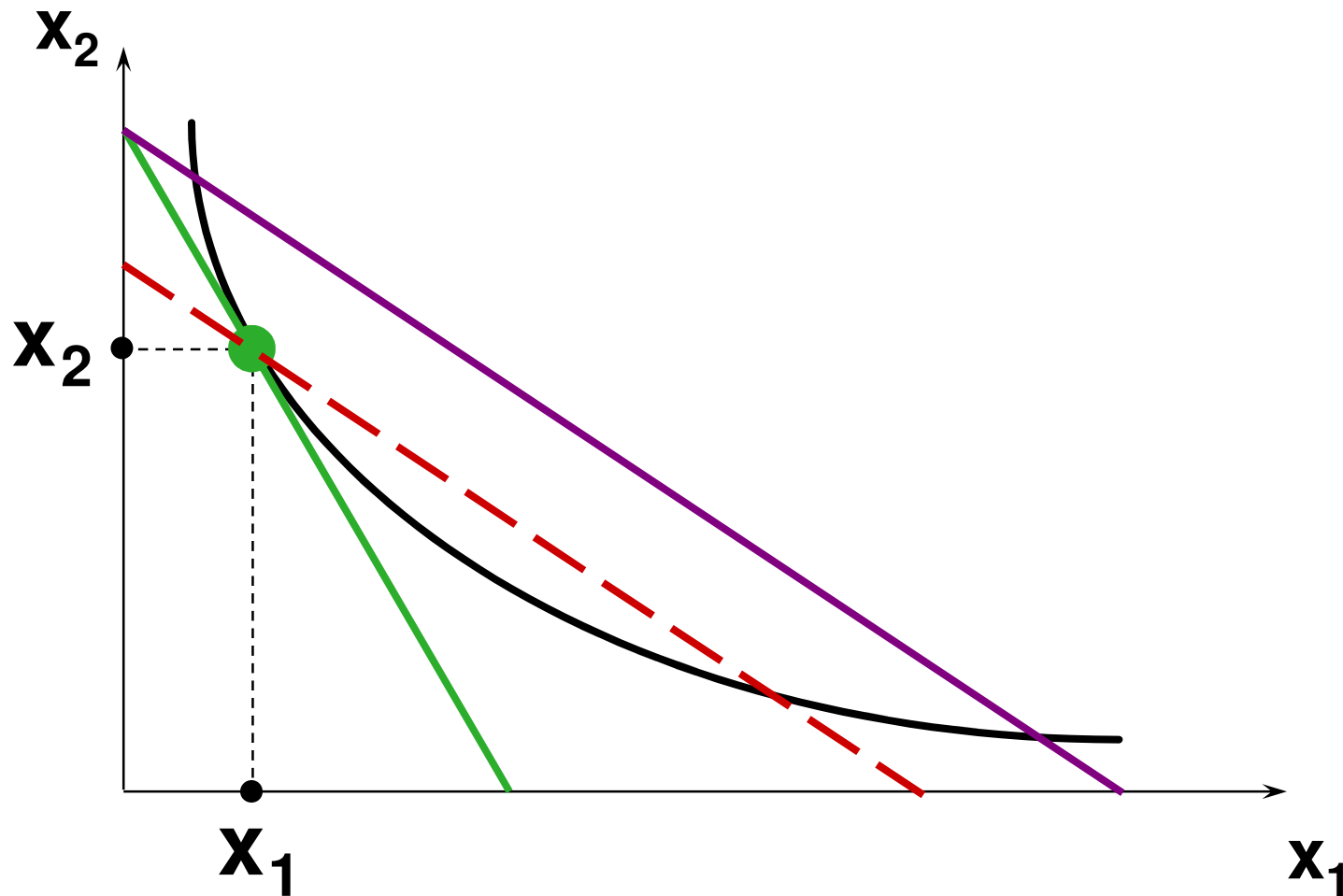


Slutsky's Effects for Income-Inferior Goods

- Tetapi ada barang yang bersifat income-inferior (i.e. Permintaan berkurang dengan bertambahnya higher income).
- Efek substitusi sama dengan barang normal tetapi efek income berlawanan arah.
- Dengan demikian, efek substitusi dan efek income berlawanan arah jika harga barang inferior berubah.

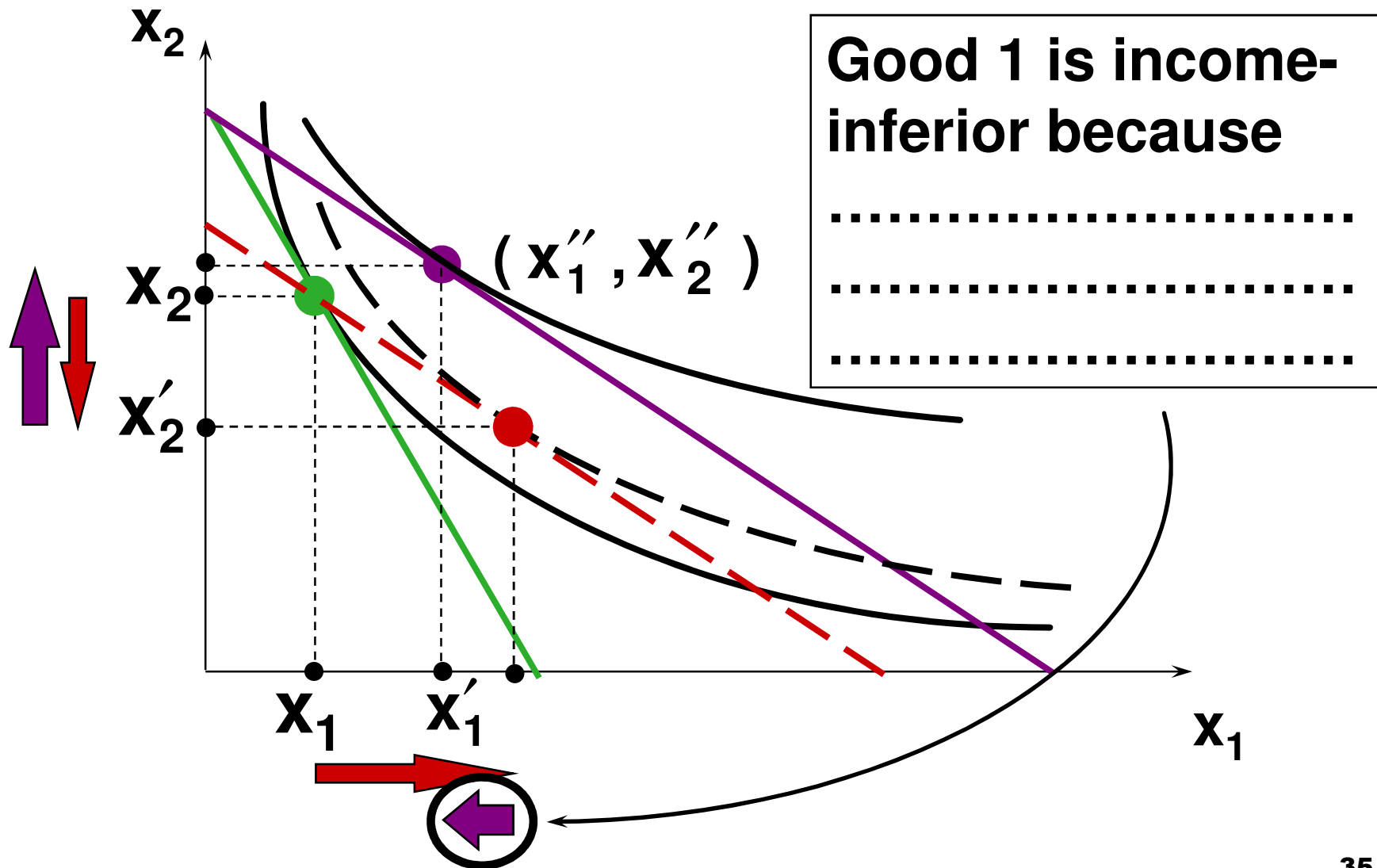


Slutsky's Effects for Income-Inferior Goods

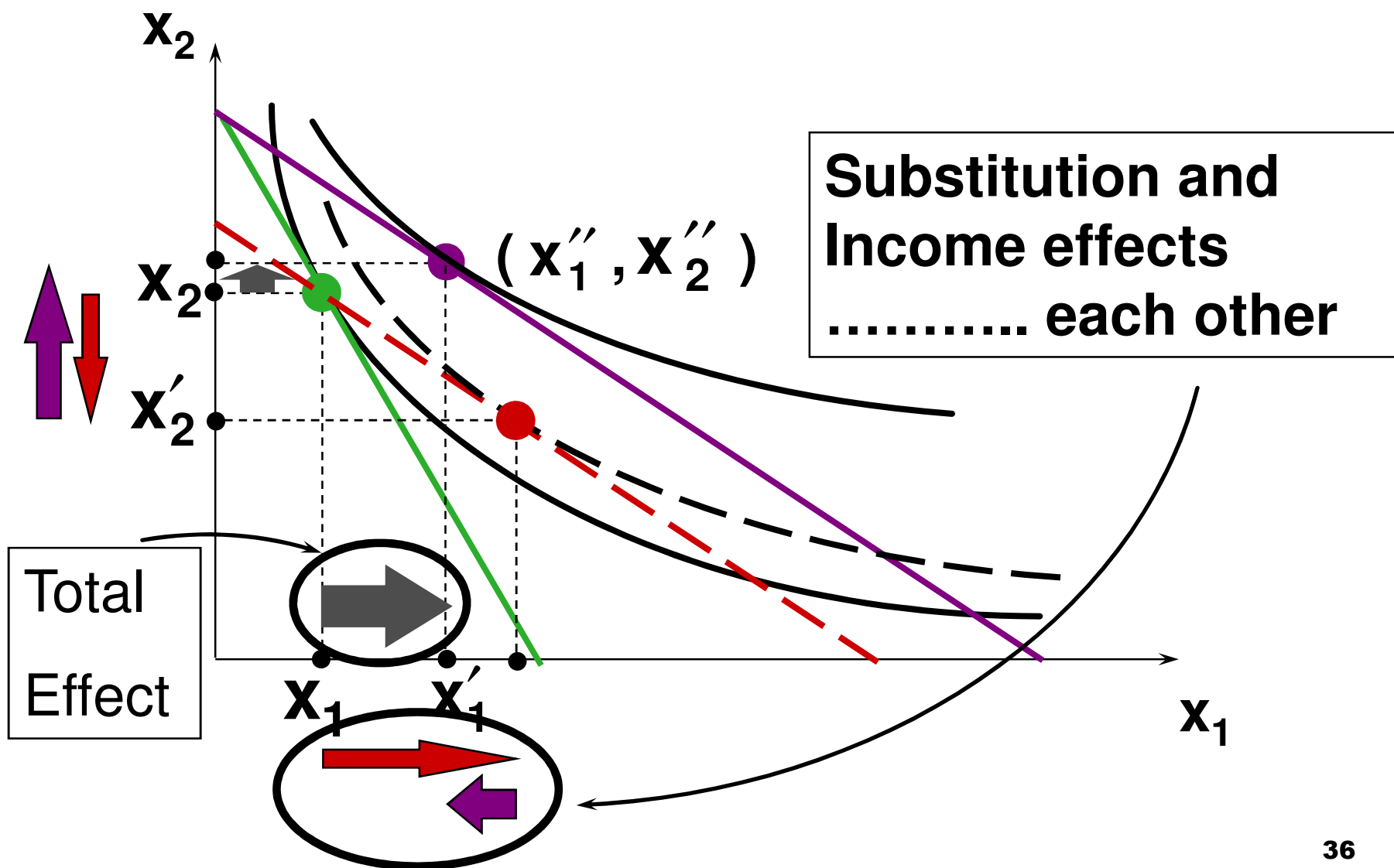




Slutsky's Effects for Income-Inferior Goods



Slutsky's Effects for Income-Inferior Goods



Slutsky's Effects for Income-Inferior Goods

- When p_i decreases, Δp_i is negative (—)

$$\Delta p_i \rightarrow \Delta x_i = \Delta x_i^s + \Delta x_i^i$$

(—) () () ()

substitution effect increases demand while
income effect reduces demand

- Alternatively,

$$\frac{\Delta x_i}{\Delta p_i} = \frac{\Delta x_i^s}{\Delta p_i} - \frac{\Delta x_i^m}{\Delta m} x_i(p_i, m)$$

() () () x ()

Slutsky's Effects for Income-Inferior Goods

- When p_i decreases, Δp_i is positive (+)

$$\Delta p_i \rightarrow \Delta x_i = \Delta x_i^s + \Delta x_i^i$$

(+) () () ()

both substitution and income effects
decrease demand when own-price rises.

- Alternatively,

$$\frac{\Delta x_i}{\Delta p_i} = \frac{\Delta x_i^s}{\Delta p_i} - \frac{\Delta x_i^m}{\Delta m} x_i(p_i, m)$$

() () () x ()



Slutsky's Effects for Income-Inferior Goods

- In general, substitution effect is greater than income effect.
- Hence, Δx_i is usually positive when p_i decreases.
and Δx_i is usually negative when p_i increases.
- That is $\frac{\Delta x_i}{\Delta p_i}$ is
and Demand Curve slopes downward

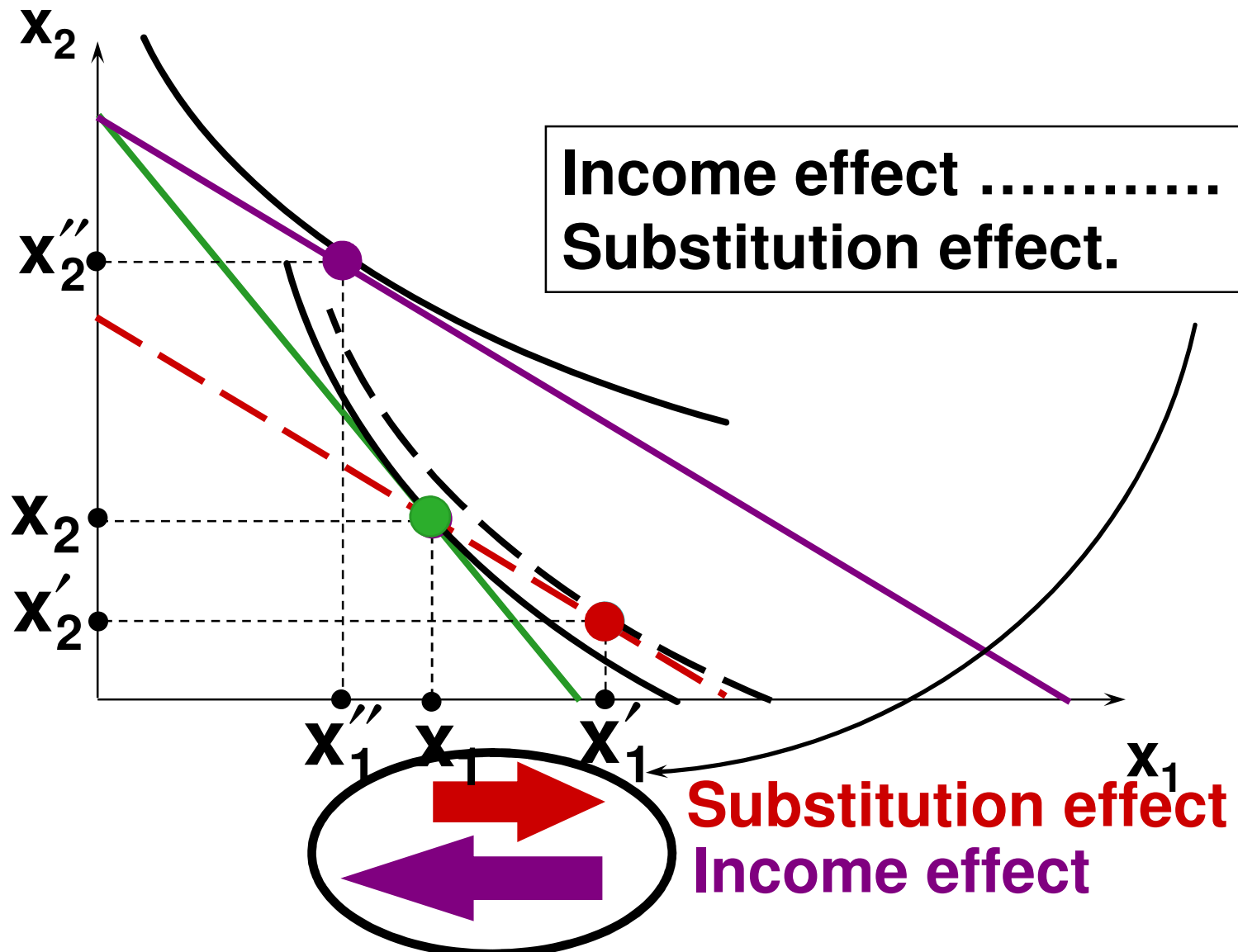


Giffen Goods

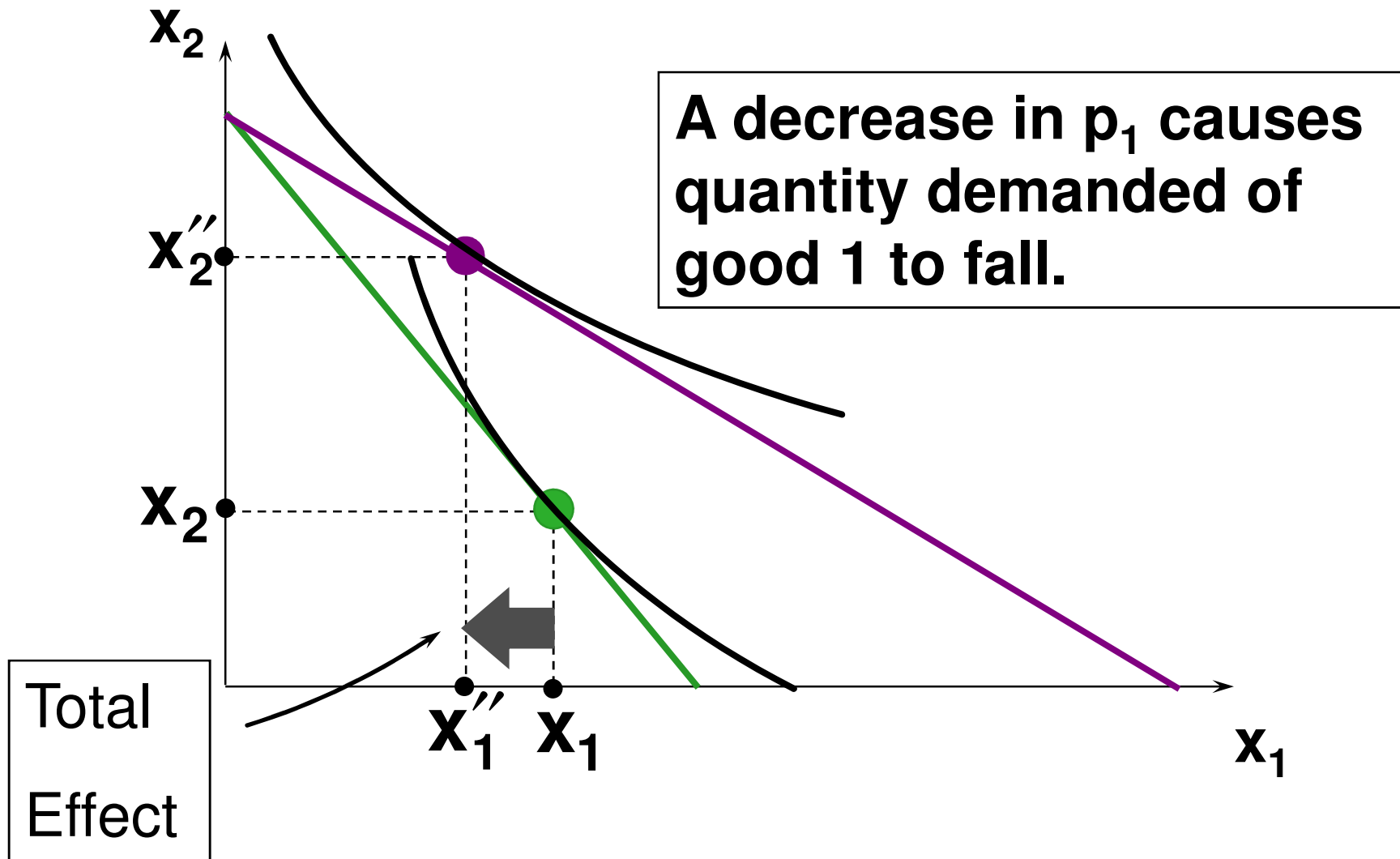
- In rare cases of extreme income-inferiority, the income effect may be larger in size than the substitution effect, causing quantity demanded to fall as own-price rises.
- Such goods are called **Giffen goods**.



Slutsky's Effects for Giffen Goods



Slutsky's Effects for Giffen Goods





Slutsky's Effects for Giffen Goods

- Slutsky's decomposition of the effect of a price change into a pure substitution effect and an income effect thus explains why the Law of Downward-Sloping Demand is violated for Giffen goods.



Hick's Income and Substitution Effects

- Previously, we learn
Slutsky's Substitution Effect: the change in demand when purchasing power is kept constant.
- Hick proposed another type of Substitution Effect where consumer is given just enough money to be on the same indifference curve.
- Hick's Substitution Effect: the change in demand when utility is kept constant.



Hick's Income and Substitution Effects

- Total change in demand when price changes

$$\Delta x_i = x_i(p'_i, m) - x_i(p_i, m)$$

can be rewritten as

$$\Delta x_i = [x_i(p'_i, e(p'_i, u)) - x_i(p_i, m)] \\ + [x_i(p'_i, m) - x_i(p'_i, e(p'_i, u))]$$

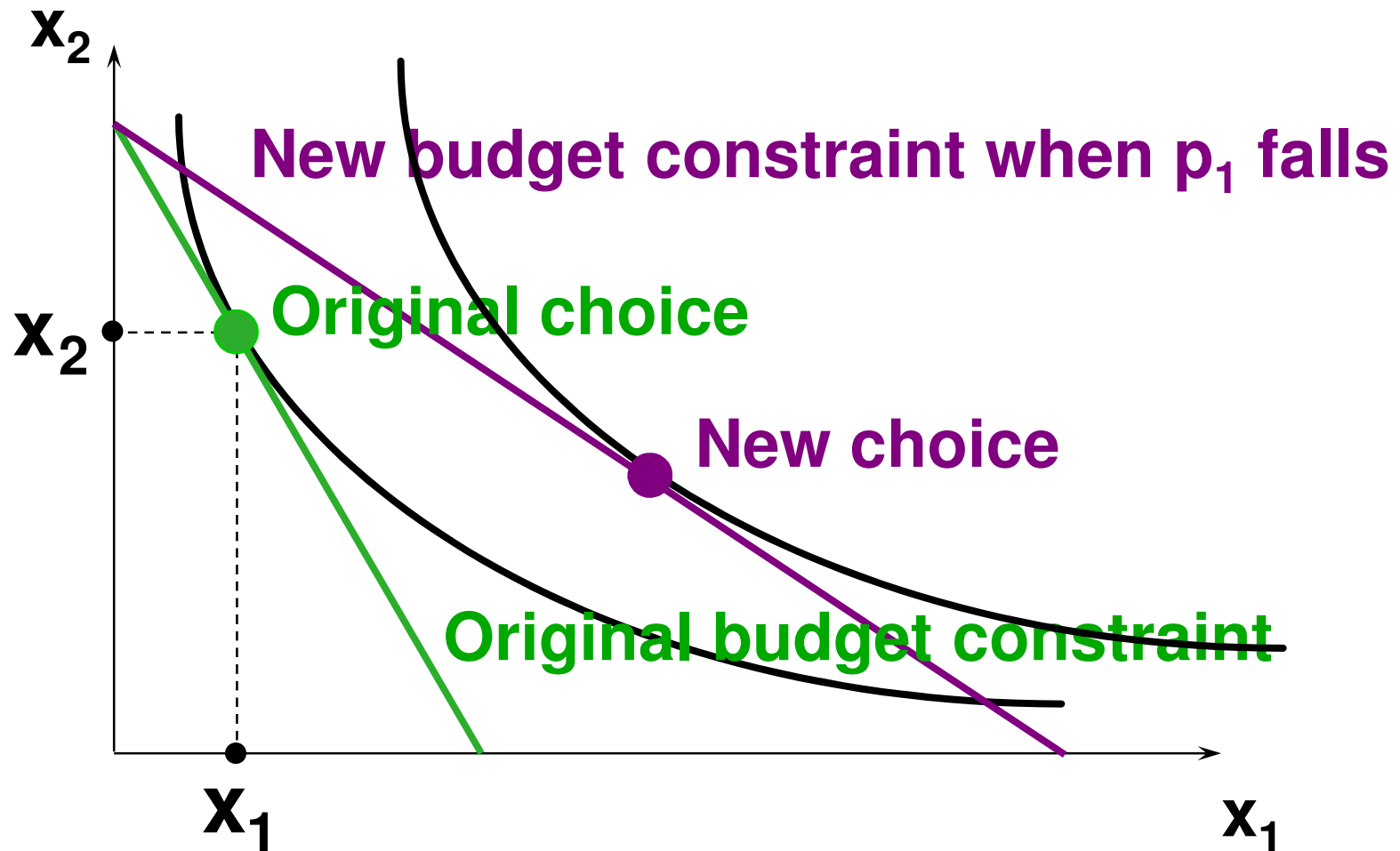
Where $e(p'_i, u)$ is minimum income needed to achieve the original utility u at price p'_i

$$[x_i(p'_i, e(p'_i, u)) - x_i(p_i, m)] = \text{substitution effect}$$

$$[x_i(p'_i, m) - x_i(p'_i, e(p'_i, u))] = \text{income effect}$$

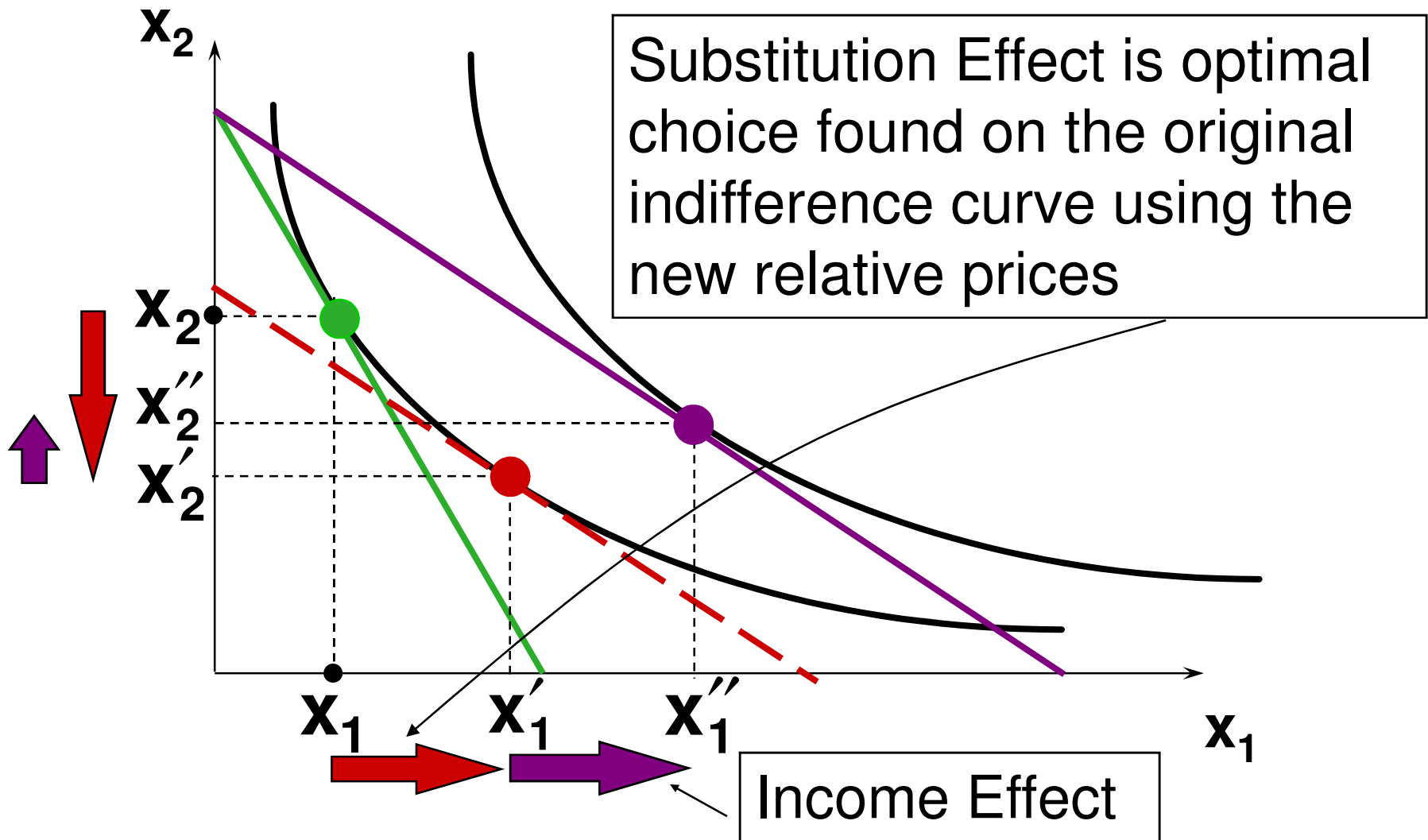


Hick's Income and Substitution Effects



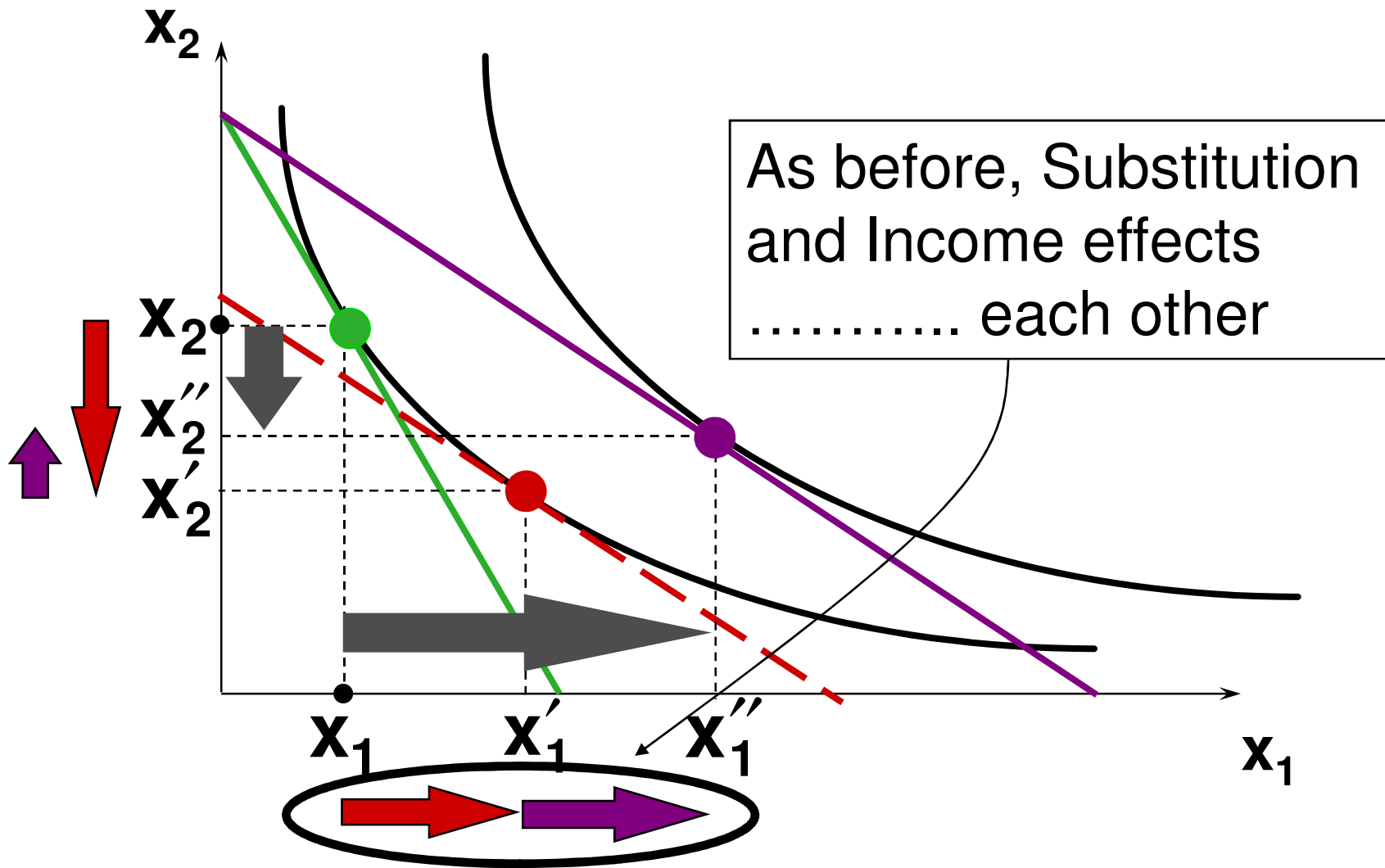


Hick's Income and Substitution Effects





Hick's Income and Substitution Effects





Demand Curves

- Marshallian (Ordinary) Demand

shows the quantity actually demanded when own price changes holding constant

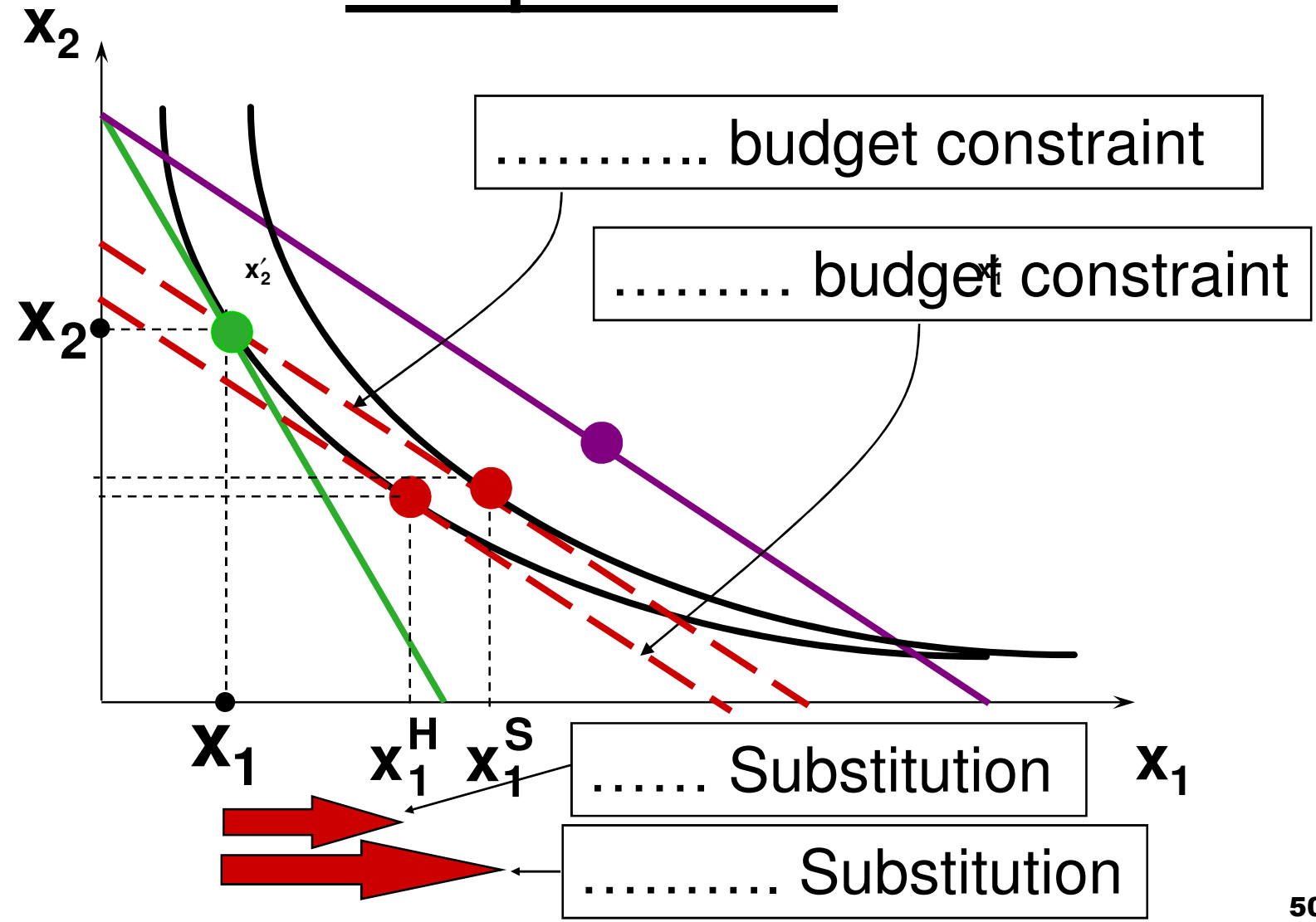
- Slutsky Demand

shows Slutsky substitution effect when own price changes holding constant

- Hicksian (Compensated) Demand

shows Hick substitution effect when own price changes holding constant

Comparison: Hick and Slutsky Substitution Effects when own price falls



Demand Curves for Normal Good when Own Price Falls

