Week 67 Demand 需求

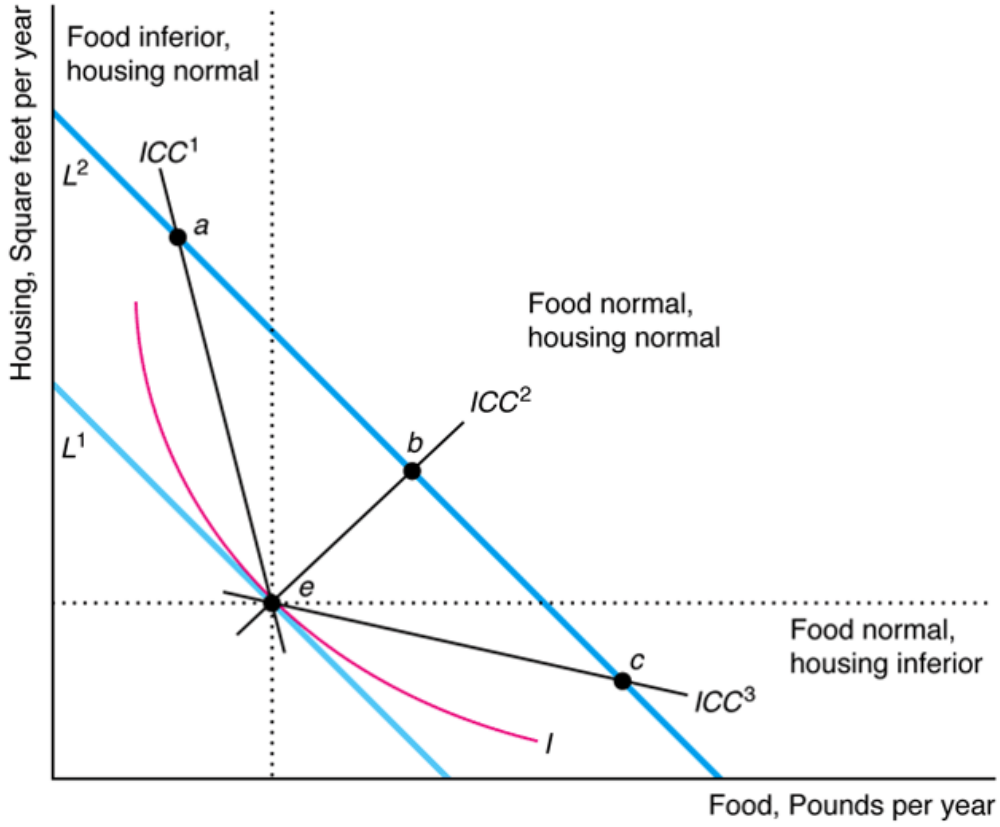
Demand curves can be derived by using consumer theory.

在既定的所得、商品價格與偏好之下，可解出消費者均衡。如果所得或商品價格(或偏好)有所變動，則原來的消費者均衡會因此發生變化。

1. 所得消費曲線與恩格爾曲線

～所得變動對消費行為的影響

所得消費曲線(Income Consumption Curve，ICC):：其他情形不變下，不同的所得水準會對應不同的消費者均衡點，這些消費者均衡的連線稱為所得消費曲線。



恩格爾曲線(Engel Curve，EC)：用來描述消費者均衡下所得與特定財貨需求量之間的關係。
將所得與X財貨需求量的對應關係畫出，變得到X財貨的恩格爾曲線。

所得彈性IE

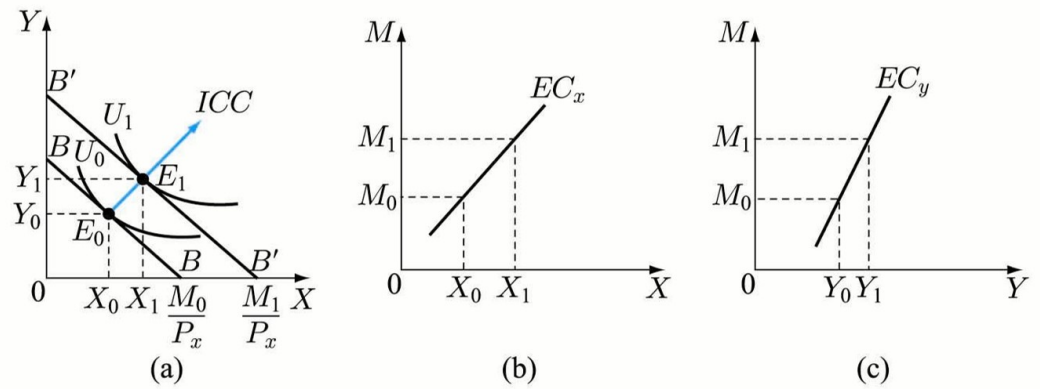
正常財，所得彈性為正；中性財，所得彈性為0；劣等財，所得彈性為負。

ICC、EC與IE的關係

- ICC、EC and Income Elasticity 1

(1) ICC為正斜率：X財貨為正常財、Y財貨為正常財

(2) EC為正斜率：X財貨為正常財、Y財貨為正常財

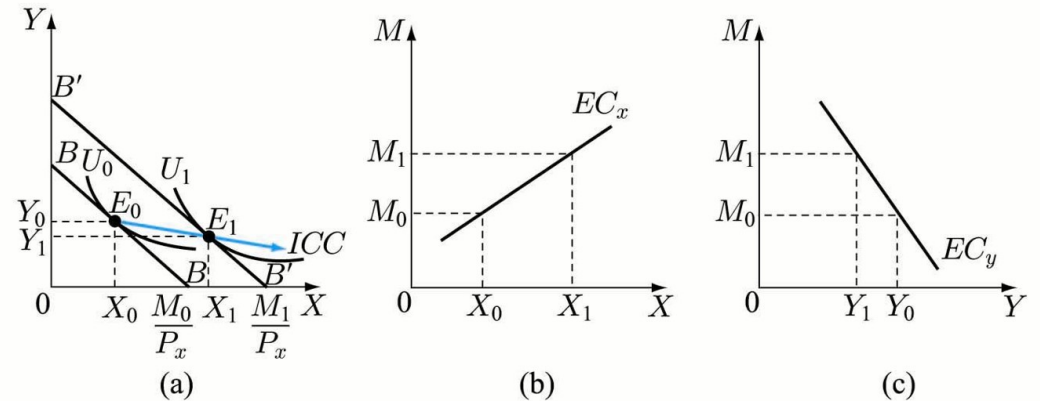


所得消費曲線為正斜率，表示所得增加後，X與Y財貨的需求量均增加，故二者為正常財，所得彈性為正。

- ICC、EC and Income Elasticity 2

(1) ICC為負斜率：X為正常財、Y為劣等財

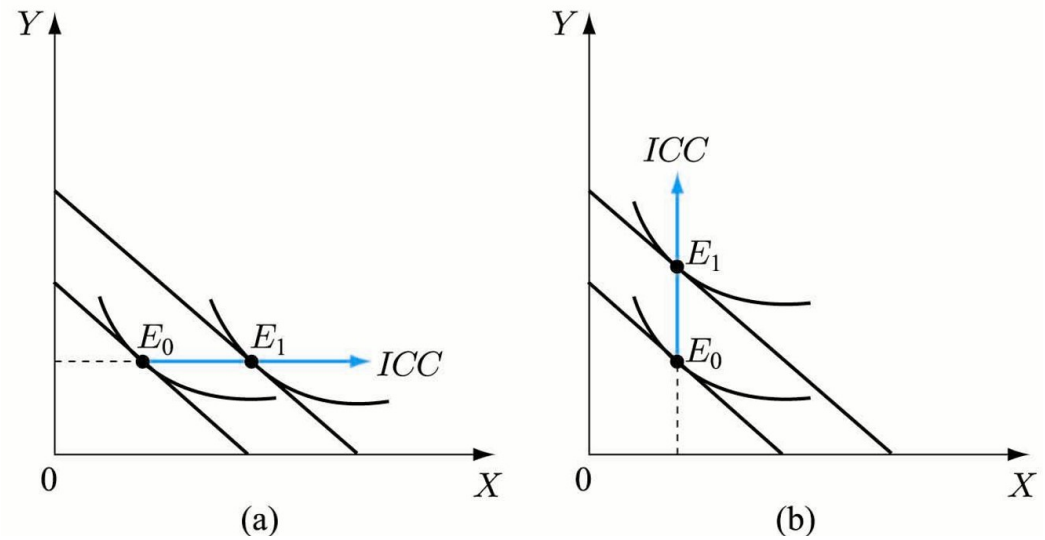
(2) EC為正斜率：X為正常財；Engel為負斜率：Y為正常財



所得消費曲線為負斜率，表示所得增加後，X財貨的需求量增加（減少），Y財貨的需求量減少（增加）。因此，X為正常財（劣等財）、所得彈性為正; Y為劣等財（正常財）、所得彈性為負。

- ICC、EC and Income Elasticity 3

(1) ICC為水平線：X為正常財、Y為中性財; ICC為垂直線：X為中性財、Y為正常財。
(2) EC為垂直線：中性財



所得消費曲線為水平線或垂直線，則表示所得增加後，X或Y財貨的消費數量不變，因此為中性財。

- 不可能所有財貨均為奢侈財
- 不可能所有財貨均為劣等財

Some Goods Must Be Normal

Engel 加總法則：所有財華的所得彈性之加權平均數等於1

$$P_1X_1 + P_2X_2 + \ldots + P_nX_n = M$$
$$P_1dX_1 + P_2dX_2 + \ldots + P_ndX_n = dM$$
$$P_1\frac{dX_1}{dM}\frac{M}{X_1}\frac{X_1}{M} + \ldots\ldots + P_n\frac{dX_n}{dM}\frac{M}{X_n}\frac{X_n}{M} = 1$$
$$\theta_1E_M^1 + \ldots\ldots + \theta_nE_M^n = 1$$

個案研究：所得效果對勞動供給的影響：歷史趨勢、彩券得主及卡內基臆測

證據顯示，長期來看，勞動供給曲線確實會呈現負斜率。一百多年前，多數人一週工作六天；但在今天，週休二日是很正常的。雖然一週的工作天數減少了，但一般勞工的工資在經過物價調整後仍是上升的。

經濟學家對這樣的歷史型態作了以下解釋：技術的進步提升了勞動的生產力，從而提升了勞動需求；勞動需求的增加造成均衡工資上升，而使工作所獲得的報酬也跟著增加。但勞工的工作時間並不會因工資不斷上升就不斷增加；當工資上升到某一水準後，多數人會變得比較重視休閒，換句話說，當工資上升到某一水準後，所得效果會大於替代效果。

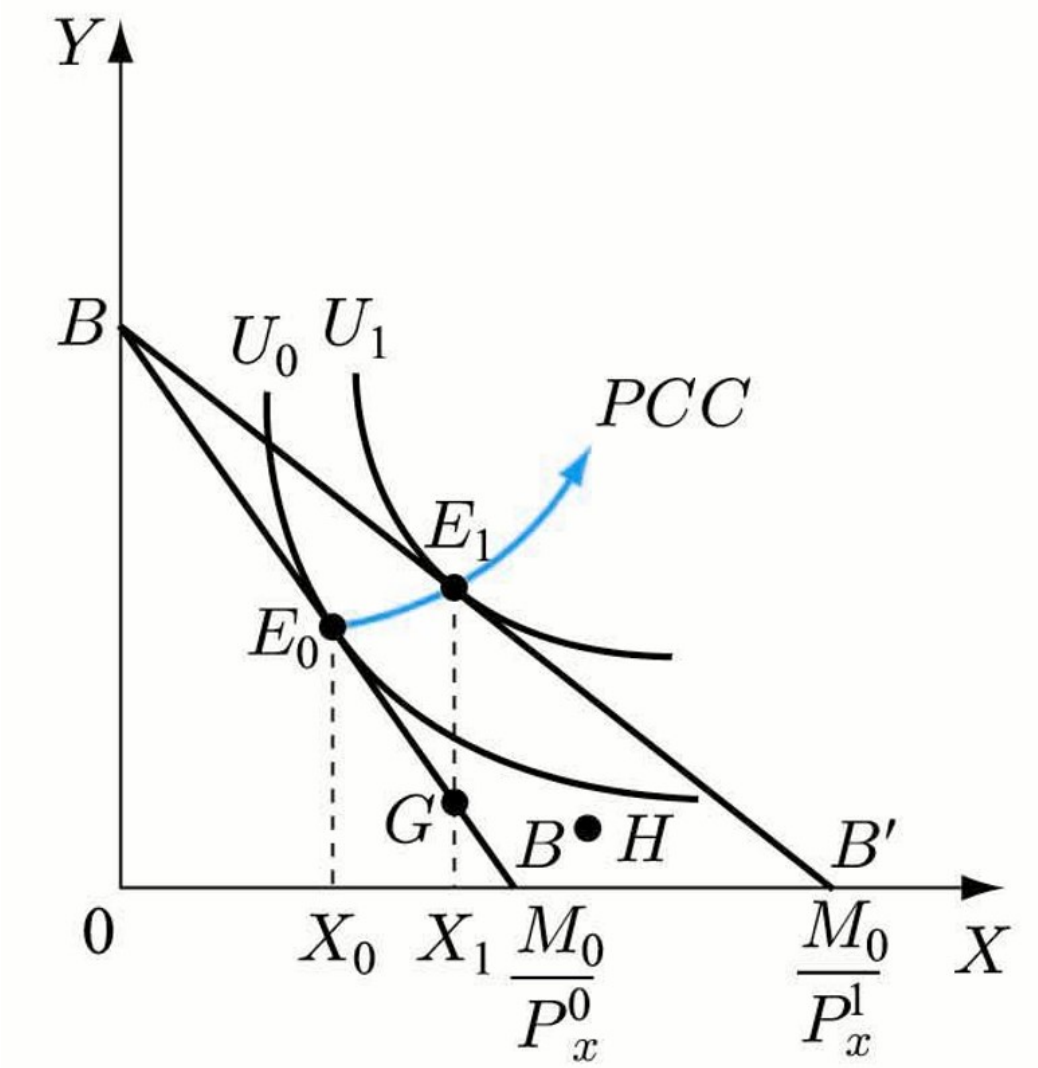
另一項顯示所得效果對勞動供給有很大影響的證據來自於另一項資料：彩券得主。
彩券得主中了大獎後，其預算限制線因所得大幅增加而大幅度外移。由於彩券得主的工資並沒有改變，因此其預算限制線的斜率不變，也就是說，沒有替代效果。藉由對彩券得主的行為分析，我們可以看出所得效果對勞動供給的影響。那些得獎超過50,000美元的得主，幾乎有25%在一年內辭掉工作，另外有9%的人減少其工作時數。至於那些得獎超過100萬美元者，有四成停掉工作。所得效果對彩券得主其勞動供給的影響是顯著的。

另一項研究則指出，繼承遺產也會對勞動供給產生影響。此一研究發現，繼承超過150,000美元的人其停止工作的機率是繼承不到25,000美元的人的四倍。十九世紀的工業鉅子卡內基（Andrew Carnegie）曾警告：「留給兒子大筆財富的父母會埋沒他們兒子的才幹和活力，並讓他的生活變得無價值。」也就是說，卡內基認為所得效果對勞動供給會有顯著且令為人父母者懊悔的影響。卡內基在他生前與死後，都把他巨額財產的大部分捐作慈善用途。

2. 價格消費曲線與需求曲線

～價格變動對消費者均衡的影響

價格消費曲線(Price Consumption Curve, PCC)：其他情形不變下，不同的價格會對應不同的消費者均衡。不同價格下的消費者均衡連線稱為價格消費曲線。

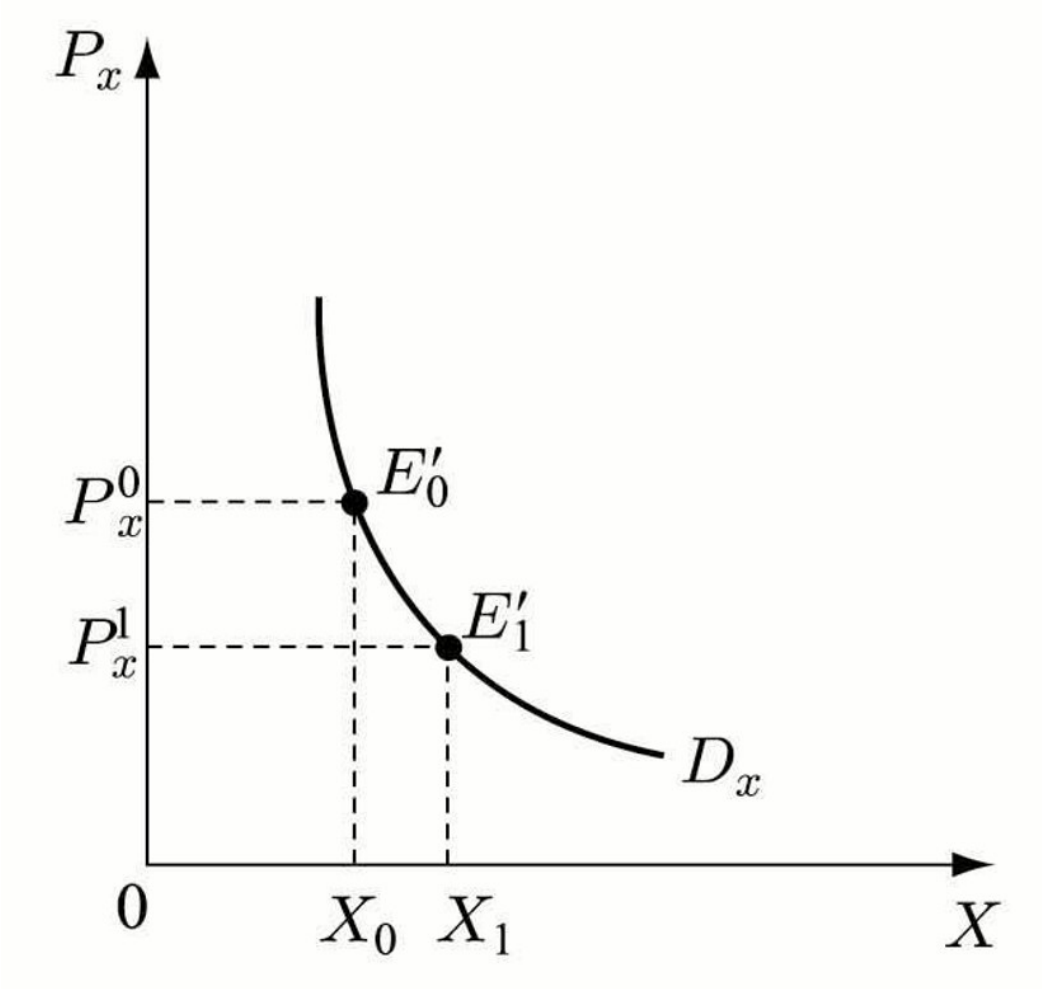


需求曲線(Demand Curve, DC)

由PCC曲線可以推導出需求曲線，將不同的X財價格對應X財的最適消費數量之關係繪圖，便得X財的需求曲線。

需求曲線表示消費者願意而且能夠消費的點。

- 「能夠」：預算限制下的價格與需求料之間的關係。
- 「願意」：無異曲線顯示消費者滿足感最大



常見效用函數所對應的需求函數：從效用極大化模型的最適解推得需求函數，亦即X^*, Y^*

			Demand Functions	
Utility Function	$U(q_1, q_2)$	Solution	q_1	q_2
Perfect complements	$\min(q_1, q_2)$	interior	$Y/(p_1 + p_2)$	$Y/(p_1 + p_2)$
CES, $\rho \neq 0, \rho < 1, \sigma = 1/(\rho - 1)$	$(q_1^\rho + q_2^\rho)^{\frac{1}{\rho}}$	interior	$q_1 = \frac{Yp_1^\sigma}{p_1^{\sigma+1} + p_2^{\sigma+1}}$	$q_2 = \frac{Yp_2^\sigma}{p_1^{\sigma+1} + p_2^{\sigma+1}}$
Cobb-Douglas	$q_1^a q_2^{1-a}$	interior	aY/p_1	$(1 - a)Y/p_2$
Perfect substitutes, $p_1 = p_2 = p$	$q_1 + q_2$	interior	$q_1 + q_2 = Y/p$	
$p_1 < p_2$		corner	Y/p_1	0
$p_1 > p_2$		corner	0	Y/p_2
Quasilinear, $Y > a^2 p_2/[4p_1]$	$aq_1^{0.5} + q_2$	interior	$\left(\frac{a}{2}\frac{p_2}{p_1}\right)^2$	$\frac{Y}{p_2} - \frac{a^2}{4}\frac{p_2}{p_1}$
$Y \leq a^2 p_2/[4p_1]$		corner	Y/p_1	0

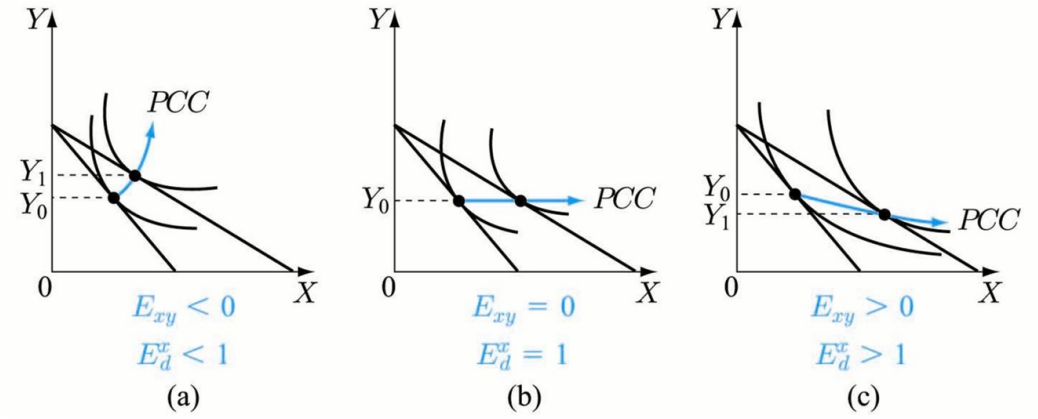
需求彈性和交叉彈性

X商品價格下降，X商品的需求數量增加；若X與Y為互補品，則Y的消費數量增加、交叉彈性為負；若X與Y為獨立品，則Y的消費數量不變、交叉彈性為0；若X與Y為替代品，則Y的消費數量減少、交叉彈性為正。

X商品的價格下降，X商品需求數量增加；若X的需求彈性大於1，則消費支出增加；若X的需求彈性等於1，則消費支出不變；若X的需求彈性小於1，則消費支出減少。

PCC、DC與Demand Elasticity and Cross Elasticity

由ＰＣＣ的形狀可探討Ｘ財貨的交叉彈性與需求彈性的大小。



～X財貨變便宜了，X的消費數量會增加，那Y的消費數量呢？

- ＰＣＣ為正斜率：互補財，交叉彈性為負
- ＰＣＣ為負斜率：替代財，交叉彈性為正
- ＰＣＣ為水平線：獨立財，交叉彈性為零

～X財貨變便宜了，X的消費數量會增加，那消費支出是增是減？
～如果把Y財貨當成是價格為1的貨幣商品，就可以代表所得水準（消費支出）。

- ＰＣＣ為正斜率：需求彈性小於1
- ＰＣＣ為負斜率：需求彈性大於1
- ＰＣＣ為水平線：需求彈性等於1

Learning By Doing 練習題

Application - Quitting Smoking

（課稅）提高香菸價格，改變消費習慣？
給錢戒煙，改變消費習慣？

- 案例一：降低吸菸需求量的方法

Question: 吸煙有害健康，請勿過量。制定公共政策者降低人們的吸菸量。

需求量減少，政府對香菸製造商課稅，使香菸的價格上漲。在香菸價格上漲之後，吸菸量會減少多少？研究結果發現，價格上漲10%造成香菸需求量減少4%。就青少年而言，效果更明顯：價格上漲10%，青少年的吸菸量減少12%。

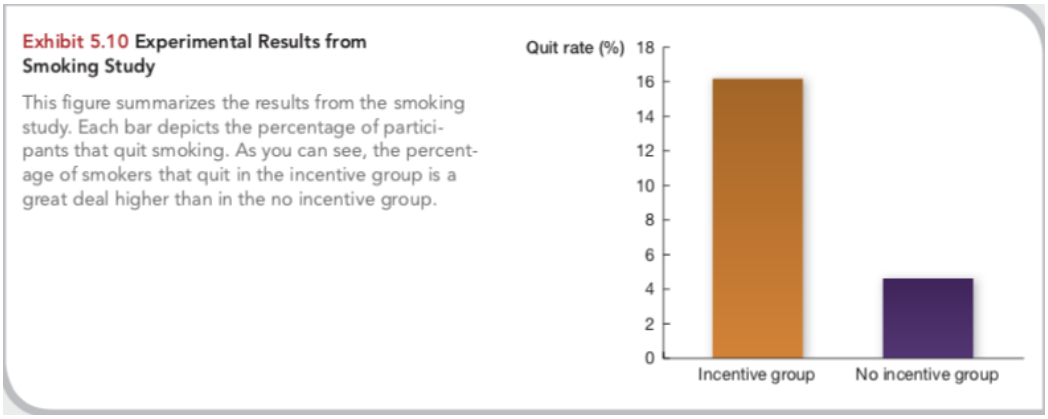
- 案例二：香菸價格如何影響違禁品（如大麻）的需求

Question:課徵香菸稅對吸煙或吸毒數量有何影響？

情況一：香菸和大麻是替代品。香菸價格提高，大麻需求會增加，因而反對課稅。

情況二：香菸與大麻是互補品。香菸為「入門毒品」，人們很少不會抽菸就直接吸食大麻等違禁品。因此，香菸價格愈低，大麻吸食量愈大，支持增稅。大部分的研究結果支持此一觀點：香菸價格愈低，大麻吸食量愈大。換言之，香菸與大麻似乎是互補品，而非替代品。

- 案例三：獎勵戒煙



3. 效用極大化與市場供需模型的關係

一般而言，財貨變貴會使得人們對它的需求量減少，但也存在著一些例外。例如，早年台灣的所得偏低，在地瓜價格上揚時，大家對地瓜的需求量不減反增。到底是什麼原因及力量造成如此「反常」的結果呢？

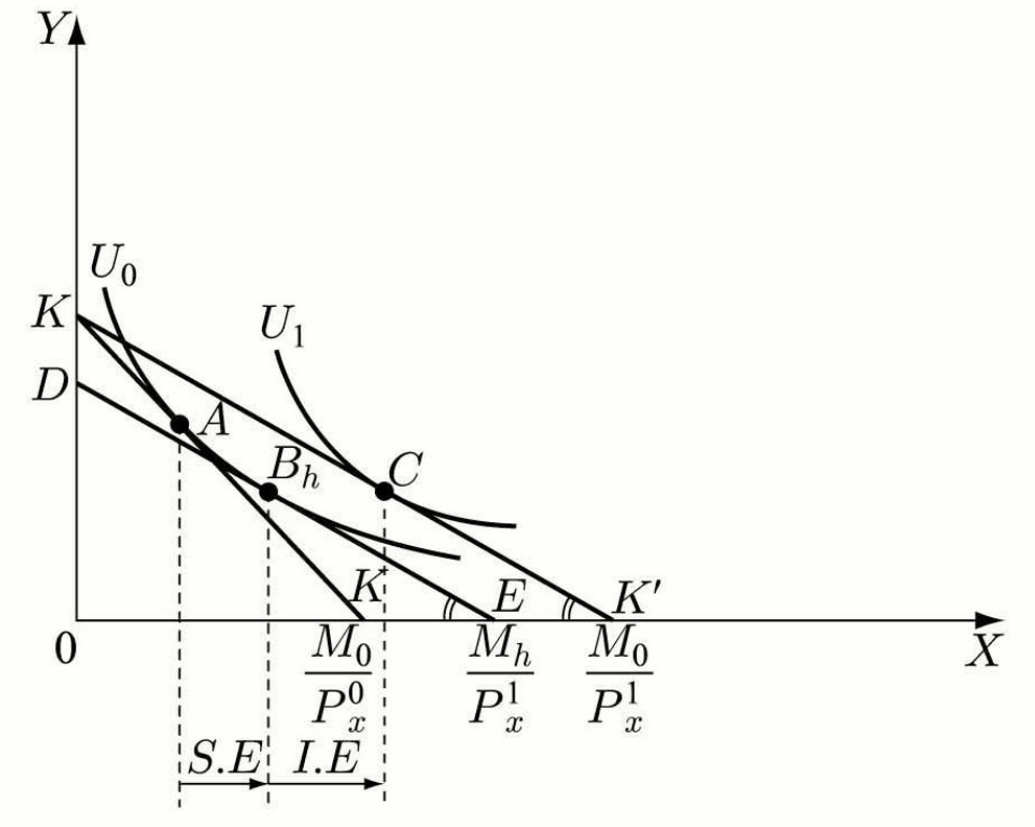
3-1. 價格效果

例如：100元買價格為20元的可樂，可口可樂3瓶與百事可樂2瓶，當百事可樂價格降為10元時，除了轉買5瓶百事可樂外，還發現可以再買5瓶可口可樂。前者稱替代效果，後者稱所得效果，整體而言是價格效果。

～ 價格效果 = 替代效果 + 所得效果

- **價格效果**：其他情況不變，財貨價格變動對需求量的影響。

當X財貨價格下降後，(A)相對價格改變，人們會買便宜的替代貴的。(B)購買能力改變，人們實質所得產生變動。



- **替代效果**：維持實質所得不變，由於相對價格發生變動所導致需求量發生變化的效果。

一般情況下，無異曲線平滑且凸向原點，替代效果永遠為負。

在實質所得不變下，當X財貨價格下降，X財貨需求量增加，Y財或需求量減少。

- **所得效果**：維持相對價格不變，由於實質所得發生變動所導致需求量發生變化的效果。

所得效果可正可負，取決於財貨是正常財或劣等財。

～ 當X財貨價格下降，實質所得增加。

- 若X是正常財，X消費數量增加，所得效果為負。
- 若X是中性財，X消費數量不變，所得效果為零。
- 若X是劣等財，X相費數量減少，所得效果為正。

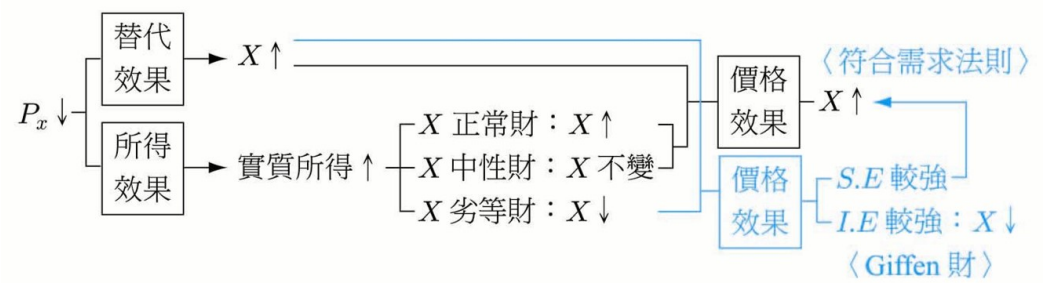
Learning By Doing 練習題

3-2. 財貨種類與需求法則

正常財和中性財一定符合需求法則。

劣等財則不一定符合需求法則。

- 劣等財且替代效果強時，符合需求法則。
- 劣等財且所得效果強時，為季芬財、不符合需求法則。



個案研究：經濟學家對於季芬財的看法

經濟學家對於季芬財是否存在有相當紛歧的看法。

一些歷史學家指出，在十九世紀的愛爾蘭家庭中，馬鈴薯實際上是季芬財。由於馬鈴薯是當時的主食，當它漲價時，所得效果會很大，於是人們會減少肉品的奢侈消費來節省開支；不過，人們為攝取起碼的熱量，只好買更多的馬鈴薯。因此，馬鈴薯的價格愈高，其需求量也愈大。

在中國湖南省一項長達五個月的實地實驗，發現季芬財存在的更多具體證據。堅森(Robert Jensen) 與米勒 (Nolan Miller) 兩位經濟學家發給隨機挑選到的家戶購米的補貼券，這意味著這些家庭所面對的米價下跌了。他們發現，窮人家的米的消費減少了，而且，當他們不再發給米的補貼券時，這些家庭的米的消費又增加了。換句話說，這些家庭的米的消費與他們所面對的實際米價呈正向關係，也就是說，對這些家庭而言，米是季芬財。

雖然以上的事實支持馬鈴薯與米的需求曲線在某些情況下是正斜率的，且這些事實是消費者選擇理論可以解釋的，但季芬財畢竟是很罕見的；也因為這樣，需求法則仍是經濟學中被普遍接受的法則。

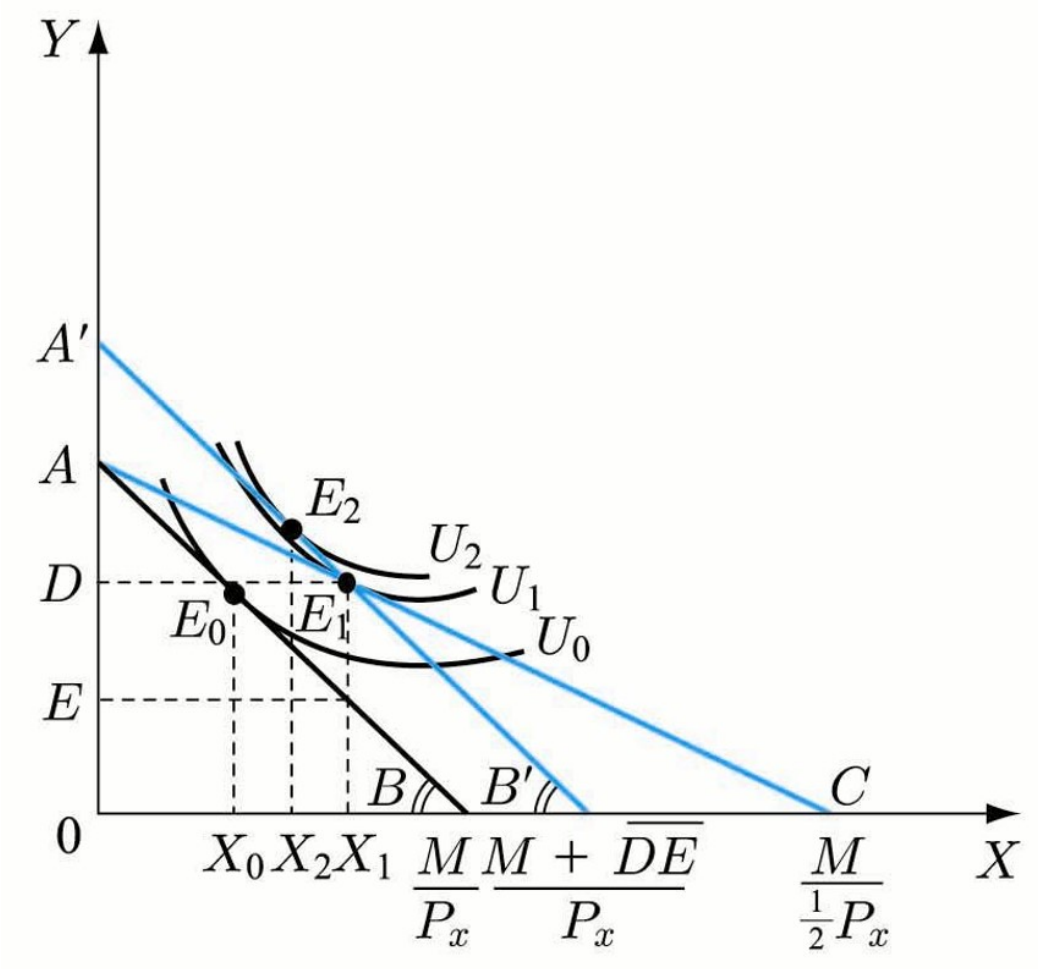
政策應用

政府照顧弱勢、改善低收入戶的生活，可以進行所得補貼、價格補貼與實物補貼，何者方式較佳？

(1) 直接津貼與間接津貼（所得補貼與價格補貼）

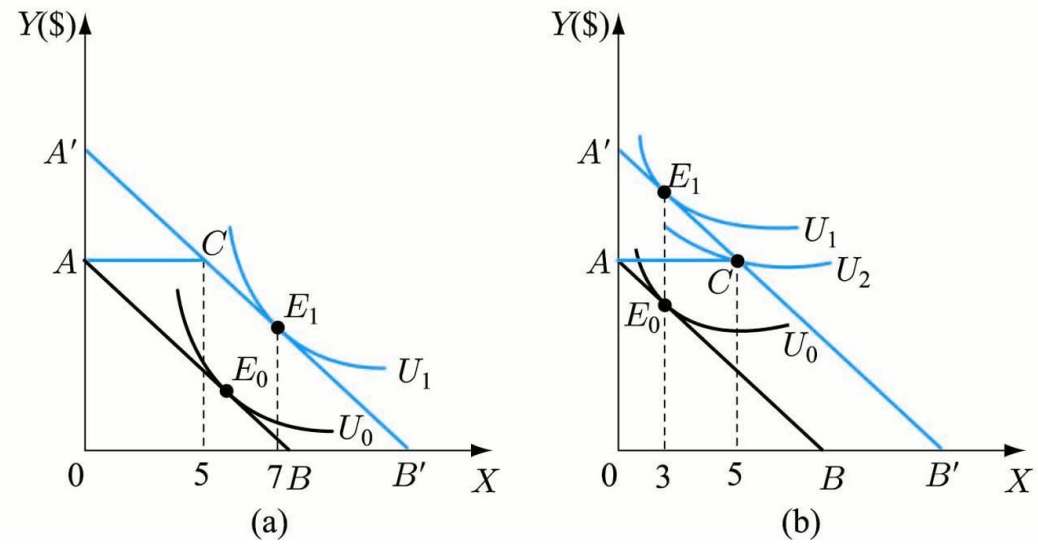
- 預算線如何變動？
- 消費者均衡為何？
- 無論價格補貼或所得補貼均可使受補貼者的福利提升。

若兩種補貼方式的金額相同，
- 站在受補貼者的福利角度來看，所得補貼優於價格補貼。$U_2 > U_1 > U_0$
- 站在鼓勵消費X商品的角度來看，價格補貼優於所得補貼。$X_1 > X_2 > X_0$



(2) 直接津貼與實物津貼（所得補貼與實物補貼）

- 預算線如何變動？（預算線平行外移/預算線為折線)
- 消費者均衡為何？
    - 情況一：兩政策新的消費者均衡相同。此時兩種政策無分軒輊。
    - 情況二：兩政策新的消費者均衡不同。亦即實物補貼之消費者均衡在拗折點上（C），效用水準為U2、消費數量為X2；所得補貼之消費者均衡在拗折點左上方（E1)，效用水準為U1、消費數量為X1 。此時，消費者喜歡所得補貼政策，效用水準U1>U2。不過，消費數量X2>X1。
- 若無法轉售，那所得補貼所提升的福利一定大於等於實物補貼所提升的福利。
- 若可以轉售，那所得補貼所提升的福利一定等於實物補貼所提升的福利。



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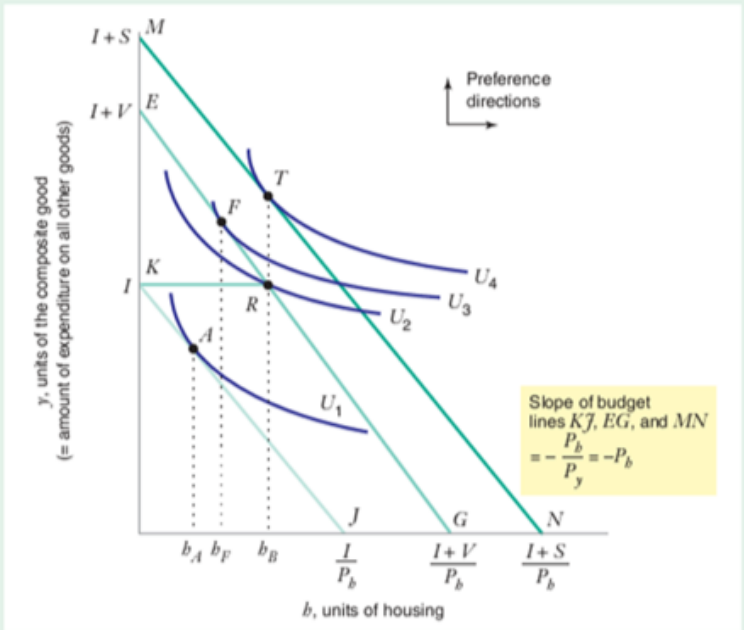


FIGURE 4.12
Optimal Choice of Housing: Subsidy and Voucher
If a consumer has an income *I*, he will choose h_A units of housing. The government could induce him to choose h_B units of housing with either of the following two programs:

- Give him an income subsidy of *S* dollars, moving the budget line to *MN*. The consumer chooses basket *T*.
- Give him a housing voucher worth *V* dollars that can be spent only on housing, moving the budget line to *KRG*. The consumer chooses basket *R*.

Since basket *T* lies on a higher indifference curve than basket *R*, a consumer with the preferences in the graph would prefer an income subsidy of *S* dollars over a housing voucher worth *V* dollars. However, the government might choose the voucher program because it would cost less. To induce the consumer to choose h_B units of housing, the government must spend $(S - V)$ dollars more if it chooses the cash subsidy program instead of the voucher program.

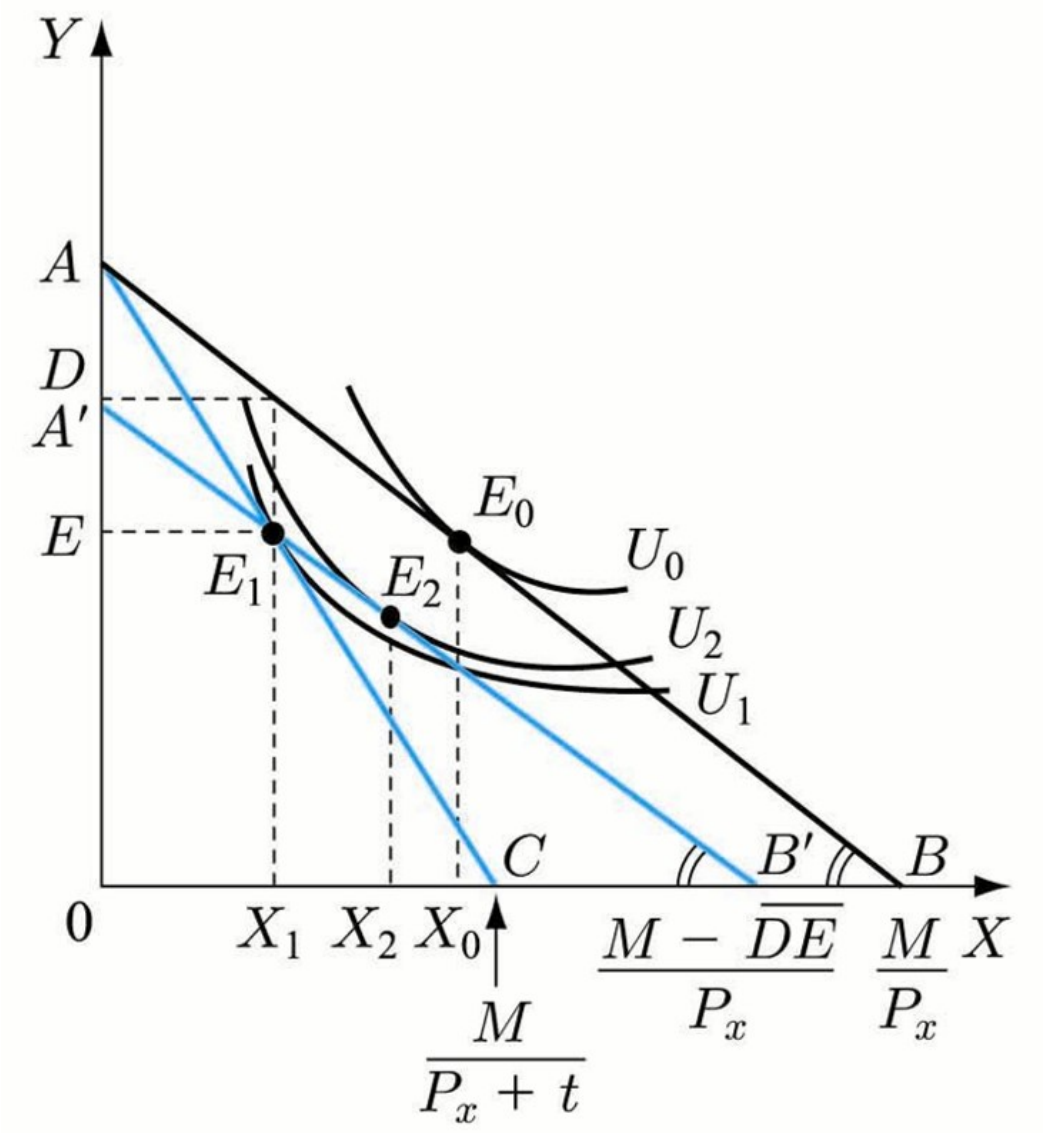
- 情況三：兩政策的新消費者均衡不同時，如何變成相同？可透過提高現金補貼金額，讓新的消費者均衡相同。亦即禮券補貼之消費者均衡在拗折點上(R)，效用水準為U2、消費數量為X2；原現金補貼V元之消費者均衡在拗折點左上方(F)，效用水準為U3、消費數量為X3 。新的現金補貼S元，消費者均衡在(T)，效用水準為U4、消費數量為X4 。因為S>V，效用水準U4>U3>U2，而消費數量X2=X4>X3。

Q：政府該選擇哪一種政策？

- 在相同消費數量下，消費者偏好所得補貼S元而非實物補貼V元。
- 從成本角度而言，政府偏好禮券補貼政策，否則政府支出將多（S-V）元。
- 不過，許多政府喜歡採用現金補貼政策，一般民眾支持採用實物政策。

(3) 所得稅與消費稅

- 無論消費稅或所得稅均會使福利下降及消費量減少。若兩種課稅方式的政府稅收相同
    - 站在消費者的角度來看，從福利來看，所得稅優於消費稅。
      $X_1 < X_2 < X_0$
    - 站在消費X商品的角度來看，所得稅優於消費稅。$U_1 < U_2 < U_0$
    - 站在抑制消費X商品的角度來看，如奢侈稅，消費稅優於所得稅。



Challenge Case

Per-Hour Versus Lump-Sum Childcare Subsidies

Childcare subsidies are common throughout the world. According to an Organization for Economic Cooperation and Development report in 2012, childcare spending as a percentage of gross domestic product was 0.9% in Sweden and Norway, 0.5% in the United Kingdom, 0.4% in France, 0.3% in Japan, and 0.1% in Germany and the United States.

The increased employment of mothers outside the home has led to a steep rise in childcare over the past several decades. In the United States today, nearly seven out of ten mothers work outside the home—more than twice the rate in 1970. Eight out of ten employed mothers with children under age six are likely to have some form of nonparental childcare arrangement. Six out of ten children under the age of six are in childcare, as are 45% of children under age one.

Childcare is a major burden for the poor, and the expense may prevent poor mothers from working. Paying for childcare for children under the age of five absorbed 25% of the earnings for families with annual incomes under 14,400, but only 6% for families with incomes of 54,000 or more. **Government childcare subsidies increase the probability that a single mother will work at a standard job by 7% (Tekin, 2007).** As one would expect, the subsidies have larger impacts on welfare recipients than on wealthier mothers.

In large part to help poor families obtain childcare so that the parents can work, the U.S. Child Care and Development Fund (CCDF) provided 5.7 billion to states in 2013. Childcare programs vary substantially across states in their generosity and in the form of the subsidy. **Most states provide an ad valorem or a specific subsidy (see Chapter 3) to lower the hourly rate that a poor family pays for childcare.**

Rather than subsidizing the price of childcare, **the government could provide an unrestricted lump-sum payment that could be spent on childcare or on all other goods,** such as food and housing. Canada provides such lump-sum payments.

For a given government expenditure, does a per-hour subsidy or a lump-sum subsidy provide greater benefit to recipients? Which option increases the demand for childcare services by more? Which one inflicts less cost on other consumers of childcare?

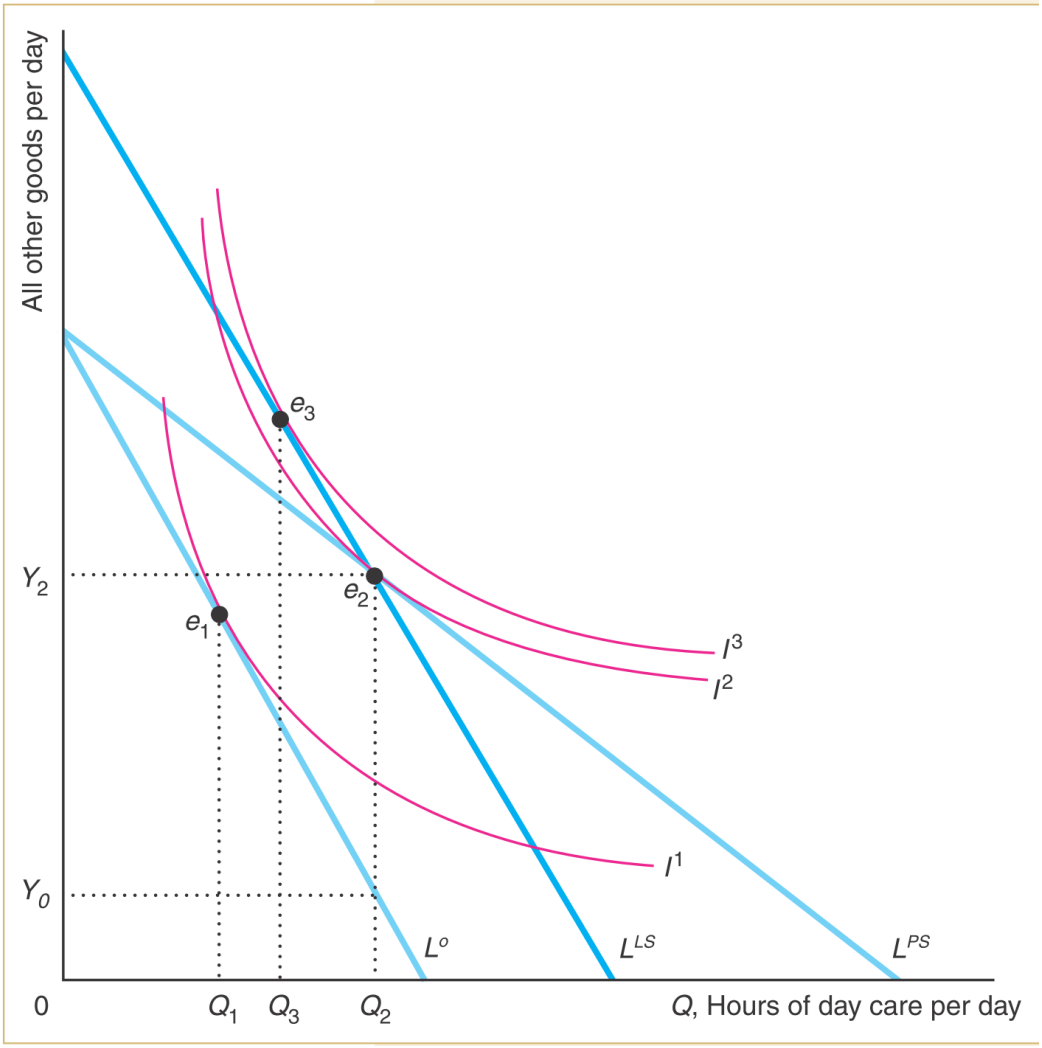
婦女出外工作的比例越來越高，導致兒童照顧的需求大幅增加。對於窮人來說，兒童是沈重的負擔，為了避免托嬰之類的支出，很可能會減少貧窮婦女外出工作的機會。因此，兒童照顧補貼是各國常用的政策，政府的兒童照顧補貼政策大概可以提高婦女7%的就業率。

補貼有從價補貼、從量補貼，以及定額補貼的型式，到底哪一種比較有效呢？也就是說，哪一種可以增加最多的婦女就業率，亦即需要最多的兒童照顧服務？哪一種其他孩童照顧的消費者付的代價最少呢？

Challenge Solution

We now return to the questions raised at the beginning of the chapter: For a given government expenditure, does a childcare per-hour subsidy or a lump-sum subsidy provide greater benefit to recipients? **Which option increases the demand for childcare services by more? Which one inflicts less cost on other consumers of childcare?**

To determine which program benefits recipients more, **we employ a model of consumer choice.** The figure shows a poor family that chooses between hours of childcare per day (Q) and all other goods per day. Given that the price of all other goods is 1 dollar per unit, the expenditure on all other goods is the income, Y, not spent on childcare. **The family's initial budget constraint is Lo.** The family chooses Bundle e1 on indifference curve I1, where the family consumes Q1 hours of childcare services.



If the government gives a childcare price subsidy, the new budget line, LPS, rotates out along the childcare axis. Now the family consumes Bundle e2 on (higher) indifference curve I2. The family consumes more hours of childcare, Q2, because childcare is now less expensive and it is a normal good.

One way to measure the value of the subsidy the family receives is to calculate how many other goods the family could buy before and after the subsidy. If the family consumes Q2 hours of childcare, the family could have consumed Yo other goods with the original budget constraint and Y2 with the price-subsidy budget constraint. Given that Y2 is the family's remaining income after paying for childcare, the family buys Y2 units of all other goods. **Thus, the value to the family of the childcare price subsidy is Y2 - Yo.**

If, instead of receiving a childcare price subsidy, the family were to receive a lump-sum payment of Y2 - Yo, taxpayers' costs for the two programs would be the same. **The family's budget constraint after receiving a lump-sum payment, LLS, has the same slope as the original one, Lo, because the relative prices of childcare and all other goods are the same as originally**. This budget constraint must go through e2 because the family has just enough money to buy that bundle. However, given this budget constraint, the family would be better off if it buys Bundle e3 on indifference curve I3 (the reasoning is the same as that in the Consumer Price Index analysis in Figure 5.5). The family consumes less childcare with the lump-sum subsidy: Q3 rather than Q2.

Poor families prefer the lump-sum payment to the price subsidy because indifference curve I3 is above I2. Taxpayers are indifferent between the two programs because they both cost the same. The childcare industry prefers the price subsidy because the demand curve for its service is farther to the right: At any

given price, more childcare is demanded by poor families who receive a price subsidy rather than a lump-sum subsidy.

Given that most of the directly affected groups benefit from lump-sum payments to price subsidies, why are price subsidies more heavily used? One possible explanation is that the childcare industry very effectively lobbied for price subsidies, but that is not true. Second, politicians might believe that poor families will not make intelligent choices about childcare, so they might see price subsidies as a way of getting such families to consume relatively more (or better-quality) childcare than they would otherwise choose. Third, politicians may prefer that poor people consume more childcare so that they can work more hours, thereby increasing society's wealth. Fourth, politicians may not understand this analysis.

比較價格補貼與定額補貼兩個政策與原始消費均衡。

價格補貼政策會使孩童照顧的數量增加最多，在Q2的消費量下，如果政府沒有補貼，其他商品的消費為Y0。因此，價格補貼的實際價值為Y2-Y0。

定額補貼的孩童照顧數量增為Q3。由於無異曲線I3>I2，消費者喜歡定額補貼。納稅人的租稅負擔相同，所以偏好一樣。孩童照顧產業則偏好價格補貼政策，消費者會購買更多數量的孩童照顧。