**EXAMPLE 1.6.2 :** If we change endowment : $e_1 = (0,1), e_2 = (1,0)$, then we get stability. The location of endowment plays role in getting stability (See figure (b)).

**THEOREM 1.6.1 (Slutsky Equation) :**

$$\frac{\partial x_i}{\partial p_j} = \frac{\partial x_i}{\partial p_j} \mid_{u=u^0} - x_j \frac{\partial x_i}{\partial m} \mid_{p=p^0}$$

- The LHS is the total effect and is a slope of demand curve.
- The first term of RHS is the substitution effect and is always negative with respect to the own price.
- $\partial x_i / \partial m$ is the income effect, which is positive for normal goods and negative for inferior goods.
- For normal good, we get a negative sloping demand curve.
- For Giffen good, the negative income effect dominates substitution effect, so that we have positive sloping demand and thus the law of demand is violated.
- When the total effect is positive, they are called gross substitutes (chicken and beef). When it is negative, they are gross complements (coffee and sugar).
- Slutsky matrix is symmetric and negative semidefinite and diagonal elements represent own-price effect. Gross substitutability is very important for stability.

**DEFINITION 1.6.2 (Hicksian Stability) :** The market for good $j$ is *perfectly stable* if all other prices being constant and the following conditions hold :

(1) $E_{jj} = dE_j/dp_j < 0$, where $E_j(p)$ is the excess demand function.

(2) if $p_k$ is flexible for $k \neq j$, $p_k$ adjust in such a way to make $E_k = 0$.

(3) if $p_m$ is flexible for $m \neq j, k$, $p_m$ adjusts so that $E_m = 0$ and so forth.

Note that $dE_j = \sum_k E_{jk} dp_k$ If there are two goods $j, k$, $dE_k = 0$ so that $dp_j = dE_j E_{kk} / \mid D_2 \mid$. Since $E_{kk} < 0$ by the condition (1), the sufficient condition is $\mid D_2 \mid > 0$.

**THEOREM 1.6.3 :** If $(-1)^n |D_n| > 0$ where $|D_n|$ is the $n$-th principal minor of Slutsky matrix, then the economy is Hicksian stable.