

# Equity and efficiency defined and considered

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Edward R. Morey: Efficiencyequity.pdf

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**So, my experience is that while I provide the correct definitions of efficiency and inefficiency, along with examples, a number of students never really get what the two words mean, and their implications.**

**It could be for a large number of reasons including the fact that many people use these word to mean many different things. But, one possibility is how I present and explain the concepts in my notes and lectures.**

**So, two years ago on my econ 4545 final I asked for an explanation of why so many people do not understand.**

1. So, I need your help. We spent a great deal of time discussing economic efficiency and what it implies in different situations. It was, and remains, a difficult concept to grasp. This lack of understand is something I have observed over years of teaching, but it seems to be getting worse (or maybe I am just getting older).

Is there something wrong with how I am presenting the concept. (Note that my definitions are correct: An allocation is efficient when the only way to make one member of society better off requires that another member be made worse off. And, if for a reallocation, the gain the gainers is greater than the loss to the losers, the reallocation would be efficiency increasing.)

This question has two parts:

- (A) Write a short essay for a student just starting Econ 4545 that presents and explains efficiency in a way that she will understand and be able to apply.
- (B) For me, not for this prospective student, discuss the flaws in my presentation and applications of efficiency, and inefficiency.

**One student, Miquel, provided a flow chart for deciding whether a reallocation is efficiency increasing (or decreasing) and whether the current (or new allocation) is efficient.**

**So, for now I am going to present both my standard explanation, along with Miquel's explanation and flow chart. Later in the course after we have used the**

**concepts of efficiency and efficiency increasing, I will ask you to rate the two explanations.**

You might want to study my Econ 2010 notes

[Additional concepts: marginal analysis, specialization, equilibrium, and how economists judge economic systems](#)

(The last section on judging economic systems)

[Efficiency, equity and the market's ability to achieve an efficient allocation](#)

And my Econ 4999 notes

[“Efficiency is like “good” sex: more is better, except when it’s not”](#)

People are concerned about natural and environmental resources because they feel these resources are not being correctly allocated.

That is, they think that the natural resource sector of the economy is *screwed up*.

Reasons usually fall into one of two categories:

The market is at fault and more government control is needed, or

The government is at fault and less government intervention is called for.

Screwed up is a nice expression, but we need to be more precise.

## Economists define screwed up to mean the allocation of resources is either inefficient, inequitable, or both.

(Sometimes people include *not sustainable* as another form of screwed up; economists typically don't include it—an economist would say that under certain circumstances, sustainable is not efficient).

Equitable means fair. What is fair is a normative issue. There is no right or wrong answer from an economic perspective. Opinions can differ. Fair does not necessarily mean *equal*

For now, assume we all agree on who is and who is not a member of society—this is critical

It will be critical for you to understand the distinction between *efficient (inefficient)* and *efficiency increasing (efficiency decreasing)*

It is critical that you understand that the economic definition of efficiency is **not** how most people define or understand the word, so you might have to unlearn what you know.

Write down on a piece of paper a definition of when an allocation of resources is efficient. Now burn the piece of paper.

**According to economists, an allocation of resources is efficient if it impossible to change the allocation (reallocate) so as to make one or more members of society better off without making any other members worse off.**

Consider the converse, if an allocation of resources is inefficient, there is the potential for a *free lunch*: it is possible to reallocate resources in a way that makes some better off and no one worse off. When an allocation is efficient, there is no longer this potential.

So, if the potential exists, the allocation is inefficient. When the potential no longer exists, the allocation is efficient.

Efficiency sounds like a good thing – who wouldn't want a free lunch?

There can be an infinite number of allocations that are efficient. Draw a utility frontier for two individuals.

Allocations are either efficient or inefficient, and most, in the real world, are inefficient.

My experience is that most, but not all, undergraduate economics majors can recite the above definition, but have only a vague notion of what it means. **Make sure you understand. My guess is that you do not understand.**

Efficiency is all about what is **possible** and what is **impossible**. Other words that help with the definition are **only if**, **must** and **requires**.

Let me use the words **possible** and **impossible**.

The current situation is inefficient (efficient) if it is **possible (impossible)** to change things so that some members of society would be made better off and no members would be made worse off.

Efficiency is more about what is possible than what happens.

Equity and Efficiency defined and considered – Edward R. Morey - 09/11/18

In terms of **requires** and **only if**: The current situation is efficient **only if** changing things to make some members of society better off would **require** that other members be made worse off.

When I define efficiency (and inefficiency) I typically use the exact same words. This is a reason for this. Econ 4545 is not a creative writing class.

**An important question is how one might decide whether one inefficient allocation is “more” efficient than another inefficient allocation.**

I am not sure all economists would agree on how to do this, some might say efficiency is like pregnancy: “one is, or one is not ... , and there ain’t no in-between.”

Consider two allocations of resources: allocation A with lots of steaks and flat-screen TVs and allocation B with less of that stuff but with more parks and cleaner air.

Shifting from B to A (allocating resources towards the production of more steaks and TVs and away from parks and cleaner air) would make some individuals better off and some worse off.

Now consider how much those who would be better off would pay, in the common unit of exchange, to shift from B to A, and then consider how much the losers would have to be paid to voluntarily accept the shift.

If the gain to the gainers, in terms of the units of exchange, is greater than the loss to the losers, one might define allocation A as **more efficient** than allocation B. We will use this as a simple definition of *efficiency increasing*.<sup>1</sup>

Not that changes that make some better off **without** making any others worse are efficiency increasing. Economists like these kinds of changes (think they are “good” and “right”).<sup>2</sup>

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<sup>1</sup> There are some problems with this definition of efficiency increasing. For example, one can create examples where if at B going from B to A is efficiency increasing, but if at A going from A to B is efficiency increasing.

<sup>2</sup> Note that a change that makes some better off without making any others worse off is sufficient for the change to be efficiency increasing, but it is not necessary.

Changes that make some members of society better off and no members worse off are deemed *Pareto Improvements*



[Vilfredo Pareto](#) (1848-1923)<sup>3</sup>

The expression *Pareto Improvements* gives us another way to define an efficient allocation of resources. The allocation is inefficient if there are unrealized P.I.s. It is efficient if they have been realized.

Pareto improvements are efficiency increasing but not all efficiency increasing changes are P.I. This could be a true/false question on a quiz or an exam.

Reallocations that are efficiency increasing (the gain to the gainers is greater than the loss to the losers), but not Pareto Improvements (there is at least one loser) are called Potential Pareto Improvements.

It is called a Potential Pareto Improvement because one could turn it into a P.I. by redistributing the gains so that there are not losers.

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<sup>3</sup> Pareto, a father of welfare economics, eventually became disillusioned with economics—switching to sociology.

Economists typically like market transactions because they are often Pareto Improvements.

If I buy a head of organic broccoli for \$6.50 at Whole Foods (Amazon), according to economists, I am better off (I would not have voluntarily made myself worse off) and Whole Foods is better off (otherwise they would not have voluntarily sold it for \$6.50). And, if the production and my consumption of the broccoli affects no third parties, the new allocation is more efficient than the old allocation. In addition, the exchange is a Pareto Improvement.

Things are not so simple if I buy, instead, cigarettes, bullets, or gas: in those cases, individuals other than the exchangers are negatively, or positively, affected.<sup>4 5</sup>

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<sup>4</sup> Others could also be affected by my broccoli purchase depending how the broccoli was grown and whether I eat it with my mouth open, or eating it causes me to fart more.

<sup>5</sup> An interesting question is whether trades for certain commodities should or should not be allowed. Economists generally like market transactions when the transaction makes some people better off and no one worse off. An economist would add that a market transaction can be efficiency increasing even if it makes some members of society worse off. However, some people feel that certain commodities should not be traded even if all **parties to the trade** view themselves as better off. Examples of these sorts of commodities include, depending on who you ask, sex, pollution, body parts, and selling someone the right to kill and eat you (it has happened). Some people believe it is simply wrong to marketize certain types of commodities.



**Now a summary of my student’s suggestions for improving the presentation of efficiency (in no particular order):**

1. Discuss the issue of society and who is and is not a member before efficiency is mentioned, noting only that this is a critical issue for both efficiency and equity. (Or maybe do who counts afterwards, showing how it influences what is efficient or efficiency increasing.)
2. Make sure the students understand the distinction between efficiency and inefficiency before the concept of efficiency increasing is introduced. (Or maybe do efficiency increasing first, but definitely don’t present them together.)
3. Make clear up front that the economic definition of efficiency is not the street sense meaning of the word (e.g. gas efficiency). Next year I imagine that early in the term we will have everyone write their definition of efficiency on a scrap of paper, you will quickly read them, and put them in the waste basket and go outside and burn them. In the words of Jacob Hays, “Speaking generally we normally use efficient and words like, best and proficient. This is not what efficiency means economically. You’re not so much struggling teaching them a new term but you’re struggling with what they previously thought of as efficient. In the words of Yoda, ‘You must unlearn what you have learned.’”
4. Use more graphs and flow charts to represent the different aspects of efficiency, inefficiency, and efficiency increasing. Maybe a flow chart of decision points in determining whether a change (a policy) increases or decreases efficiency. In the words of Miguel, “Professor, it seems that the examples you provided us include SOME of the aspects of efficiency, but not all.<sup>6</sup> The way I see it, I would have wanted to have at least one example that included all possible outcomes, possibilities, or in other words ‘pathways’. I use the word “pathways” because; somehow that’s how I got the grasp of efficiency and inefficiency. I consider myself a sort of graphic learner, so my mind created a visual example of efficiency in which several paths could be taken.”
5. Don’t make the first quiz about efficiency depending on who is and who is not a member of society. It was too complicated. Start with a no-brainer quiz on the basic definition of efficiency where who is a member does not even come up.

**Now a slightly edited version of Miguel’s answer to the essay question.**

**Question: 1**

**PART A**

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<sup>6</sup> Edward adds: Examples are always like this: sufficient to be X but not necessary to be X. For example, being George, the giraffe is sufficient to make him a giraffe (he is an example of a giraffe) but being a giraffe does not require that you are George the giraffe. Note that examples are typically easier than definitions.

First of all, let's start with a few simple definitions.

**Efficiency:** According to economists, an allocation of resources is efficient if it impossible to change the allocation so as to make one or more members of society better off without making any other members worse off.

Stop! Now, re-read and pay extra attention to the underlined parts.

**Pareto Improvement:** Changes that make some members of society better off and no members worse off.

Stop again! Now, re-read and pay extra attention to the underlined parts.

- Note that, if a Pareto improvement takes places, the previous allocation had to be inefficient.

**Potential Pareto Improvement:** It is a PPI if the gainers from a policy change (or project) could compensate the losers from the change and still be better off. In particular note that a policy that passes this criterion does not need to include the compensation, the compensation merely has to be possible.

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The best advice I can give you to learn how to analyze a situation and correctly define efficiency is teaching you my train of thought. So, here it goes:

**First a flow chart for determining whether a SPECIFIC reallocation is (or is not) efficiency increasing**

1. Does this reallocation make at least one member better off and no members worse off?
  - a. If yes, this reallocation is efficiency increasing and the starting allocation was inefficient.
  - b. If no, this reallocation might still be efficiency increasing.
2. Even if this reallocation makes some members worse off, could the gainers of the new allocation somehow compensate the losers and still be better off?
  - a. If yes, this reallocation is efficiency increasing and the starting allocation was inefficient.
  - b. If no, this reallocation is not efficiency increasing (it is either efficiency decreasing, or neither increases or decreases efficiency).

**Is a particular allocation efficient?**

Yes, if efficiency cannot be increased by reallocating

No, if efficiency can be increased by reallocating.

## **PART B**

Professor, it seems that the examples you provided us include SOME of the aspects of efficiency, but not all. The way I see it, I would've wanted to have at least one example that included all possible outcomes, possibilities, or in other words "pathways". I use the word "pathways" because; somehow that's how I got the grasp of efficiency and inefficiency. I consider myself a sort of graphic learner, so my mind created a visual example of efficiency in which several paths could be taken.

I will try to translate my mental image to this document in the following section. (Parts A & B).

Concluding, I wouldn't change the way you teach efficiency. I would just emphasize that students have a hard time and that those students in front of you will also have a hard time understanding efficiency. As students, we assume that we know more than your previous students, so we usually ignore when you say that people have a hard time getting the grasp on efficiency. Also, as I said before I suggest you include an example with all possible outcomes when you teach your future apprentices.

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**If the “unregulated market” is causing the inefficiency, we say that the market is failing, and call what is happening a *market failure*.**

“Unregulated” means without government inference.

If the market is operating efficiently but unfairly we do not call this a market failure

In explanation, markets are not designed to be fair, so it is not a failure when the market outcome is unfair.<sup>7</sup>

On what basis does the market system decide who gets the goodies?

If there is inefficiency in the system that is not caused by the market (for example, caused by a failing of the government) we do not call this inefficiency a *market failure*; the inefficiency is not the fault of the market.

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<sup>7</sup> Some people define all market outcomes as fair, as in, “if in a perfectly competitive equilibrium people are starving this is fair because they are only starving because they are lazy.”

**Some of the concerns about environmental and natural resources are equity based, some are efficiency based, and some are both.**

Equity based: we are not including in society everyone and everything we should (animals, plants, foreigners, future generations, etc.), and if we are including them, we are not giving their well being enough weight in social decision making.

Or maybe we are including the preferences of some group whose preferences should not count, in your opinion. Think about the phrase, “America First”.

Many concerns are efficiency based: market failures are quite common wrt natural and environmental resources.

## Consider how one might represent graphically efficiency and inefficiency.

To limit the dimensionality of the graph, assume society has only two members: George and Smokey.

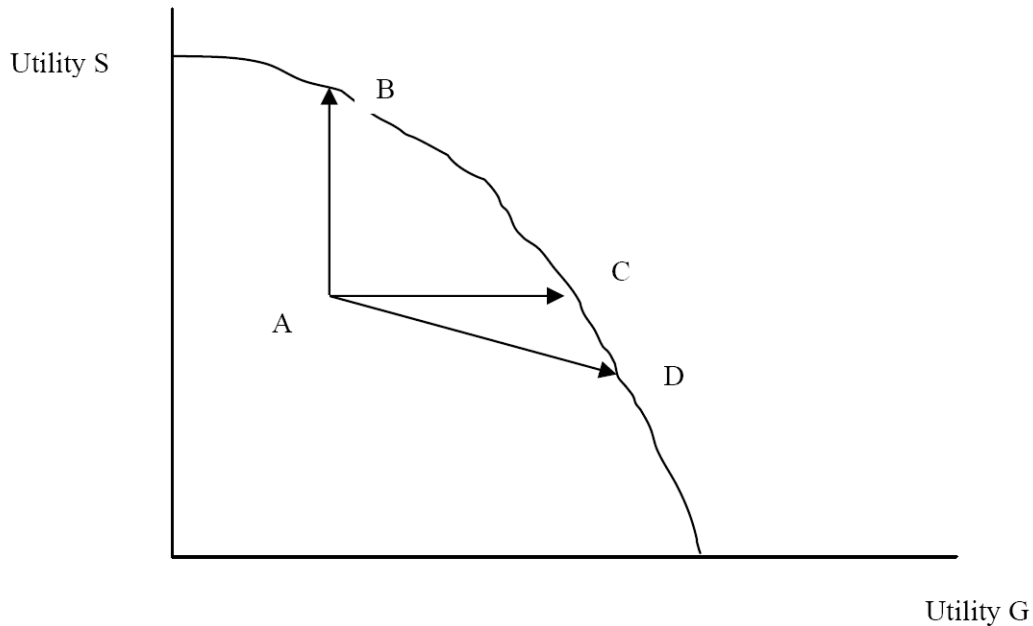
In this case, the allocation of resources is efficient if for George's utility level, whatever it might be, Smokey's utility level is maximized.

Graph this with George's utility level on the horizontal axis and Smokey's on the vertical.

The graph is most likely downward sloping: since resources are scarce, the greater George's utility level, the lower is Smokey's<sup>8</sup>

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<sup>8</sup> Increasing the utility of one does not also mean the utility of the other must decline. For example, imagine that George and Smokey are madly in love and making one happier is enough to make the other happier (the pleasure of one is pleasurable for the other) – they ascend into intertwining bliss



Any allocation of resources that results in an allocation on the downward sloping line is efficient. Denote this line the efficiency locus. Any point in the interior is inefficient. Any point to the right of the line is impossible.

Assume the initial allocation is a point A. Any reallocation of resources that moves society from A to a point on the line eliminates the inefficiency. Note that if the move is from A to somewhere on the line between B and C, including B and C, no one is made worse off by the reallocation. This reallocation is a Pareto improvement (at least one member of society is made better off and no member is made worse off).

If, on the other hand, the policy moves society from point A to a point such as D, the inefficiency in the allocation of resources has been eliminated but one member (George) of society is worse off.<sup>9</sup>

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<sup>9</sup> It is important to not misinterpret. Note that Smokey was made better off and George was made worse off by the move from A to D. However, this does not mean that A, the original point, was efficient. A would have been efficient if at A the only way to make Smokey better off **required** that George was made worse off, and this is not the case. This was the point of your first quiz.

**That is, policies that are efficiency increasing, can, and often, make some members of society worse off.**

So, switching gears a bit to see if we all understand efficiency

A possible exam or quiz question.

You and I are the only members of society. Neither of us like to be punched. I enjoy punching you, but you get no pleasure from punching me. To keep things simple, assume that my punching is the only thing that affects my WB and your being punched is the only thing that affects your WB.

What is the efficient number of punches?



Every number of punches is efficient.

**Stop here if you are still unclear on whether an allocation is or is not efficient and/or unclear on what efficiency increasing means.**

**I am now going to confuse things (maybe enlighten a few)**

We have defined efficiency, conditional on deciding who is, and who is not a member of society.

**Whether a particular allocation is efficient, or whether a particular allocation is efficiency increasing, depends on who is included in society.** (One of last year's student thought the following review questions generated much of the confusion about efficiency.)

**Some review questions: With the definition of efficiency in mind, answer the following question.**

I live in the woods with Goldilocks and three bears. Goldilocks and I don't hassle the bears and they don't hassle us.

Further assume that all of us are capable of protecting our stuff (can enforce our property rights). That is, stealing is not an option.

Goldilocks and I, each, recently inherited a bunch of trinkets.

Assume everyone prefers more to less trinkets.

Assume the bears and G prefer more to less honey, but that I do not like honey.

Before we received the boxes, everyone, including the bears, was doing the best they could, given their constraints. After receiving the UPS boxes of trinkets, Goldilocks and I traded our dead relatives' trinkets until the only additional exchanges between the two

of us that would have make one of us better off would have make the other worse off.  
These trades do not affect the bears.

However, if Goldilocks then trades the bears some trinkets for honey both parties to that trade can be made better off without affecting me. We assumed I don't like honey, but I don't care if others eat honey.

**If the trade with the bears does not take place, is society's allocation of stuff efficient? Yes or No and explain.**

The answer depends on who is a member of society.

**If society consists of all of us**, the allocation is only efficient after Goldilocks trades with the bears. Until that point one member can be made better off without another being made worse off.

**If society consists of only me and Goldilocks**, the allocation is inefficient before Goldilocks's trade with the bears (her trade with the bears makes a member of society better off (Goldilocks), and no member worse off). Is it efficient after Goldilocks trades with the bears? Yes, if property rights are well enforced, as I assumed, but no if G can steal the bear's honey. In G can take the bears honey, efficiency requires that she trades no trinkets for honey, and that she steals all of the bear's honey.

**If society consists of only the bears**, and if stealing is not possible, the allocation is efficient when there are no more trades that G and the bears could make with each other, that would make the bears better off. (Note that the bears and I will not trade.) If the bears are able to steal, efficiency requires that the bears keep all of their honey, and steal all of our trinkets.

**If society consists of only me**, and if stealing is not possible, the allocation is efficient when it is impossible to rearrange the stuff and make me better off (without me stealing). That is, there are no more trades that G and I could make with each other, that would make me better off. The trade between G and the bears, while making both of them better off has no effect on efficiency because neither are members of society. If I am able to steal, efficiency requires that I have all of the honey. Since I don't care for honey, efficiency does not depend on who get the honey.

**If society consists of only G and the bears**, and if stealing is not possible, the allocation is efficient when there are no more trades between G and the bears that would make either G or the bears better off without making the other better off. How I am affected is immaterial. If stealing is possible, efficiency requires that that all of my trinkets are stolen.

### **Now consider another scenario.**

I live in the woods with Goldilocks and three bears. We don't bother the bears and they don't bother us.

Further assume that all of us are capable of protecting our stuff (can enforce our property rights).

Assume everyone prefers more to less trinkets.

Assume G and the bears prefer more to less honey. And I do not like honey.

Goldilocks and I each recently inherited a bunch of trinkets. Before we received the boxes, everyone was doing the best they could, given their constraints. After receiving the UPS boxes of trinkets, Goldilocks and I traded our dead relatives' trinkets until the only additional exchanges between the two of us that would have made one of us better off would have made the other worse off. These trades do not affect the bears.

However, there are remaining trades between Goldilocks and the bears that would make the bears better off **but the G neither better off or worse off.**

If the exchanges with the bears do not take place, is society's allocation of stuff efficient? Yes or No and explain.

Again, the answer depends on who is and is not a member of society.

**Explaining would make a good take-home group quiz.**

What is the point of these two fairytales?

We like to think of efficiency as being a positive concept rather than a normative concept.<sup>10</sup> However, as the above examples show, whether an allocation is efficient from society's perspective is often a function of who is and who is not included in society, and

**And**, who is in and who is out is a normative issue.

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<sup>10</sup> What do we mean when we say something is a "positive concept?" Simply that all rational people would agree that the question is one of logic rather than opinion. For example, given the definition of efficiency, and agreement on who is a member of society, with enough information we would all agree on whether an allocation is or is not efficient.

**Consider one more fairytale:** I live in the woods with Goldilocks and three bears. Goldilocks and I each recently inherited a bunch of trinkets. Before we received the boxes, everyone was doing the best they could, given their constraints.

Again, assume enforceable property rights for **goods and services (trinkets and honey)**

Assume again that everyone likes more to less trinkets.

Assume G and the bears prefer more to less honey, and I do not like honey.

Assume G likes to shoot bears (C.P., she is better off every time she shoots another bear). G would not enjoy shooting me. Assume I and bears don't want to shoot anybody.

Assume I do not care whether bears get shot.

Assume the bullets cause the bears pain but does not injure or kill them. C.P. the bears are worse off each time they are shot. G is a good shot, so every shot hits a bear.

The bears are poor, having no honey, trinkets or stuff that Goldilocks or I might want.

After receiving the UPS boxes of trinkets, Goldilocks and I traded our dead relatives' trinkets until the only additional exchanges between the two of us that would have made one of us better off would have made the other worse off. These trades do not affect the bears. (Note that each of these trades was a Pareto improvements assuming G and I are members of society)

What is required for efficiency if **everyone is a member** of society, **and everyone** has property rights over their own body: one can't be shot unless one agrees to it.<sup>11</sup>

For example, if things are efficient, might some bears take some bullets?

When efficiency is achieved might the bears be consuming some trinkets or honey?

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What is required for efficiency if G and I are members of society, but the bears are **not**, and **hunting is illegal**?

For example, if things are efficient, might some bears take some bullets.

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<sup>11</sup> This case is different from hunting is illegal.

What is required for efficiency if G and I are members of society, but the bears are not, and the bears do not have property rights over their own bodies?

Does efficiency require shot bears? The more the better?

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What is required for efficiency if **everyone** is a member of society, and no one has property rights over their person?

E.g. could things be efficient if G was taking 3 shots. If G was taking 10 shots.