GENERALITY VERSUS CONTEXT SPECIFICITY:

First, Second and Third Best in Theory and Policy

by

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ABSTRACT

Second-best theory established that a policy's effect on community welfare (or any other objective function) varies with its specific context. In contrast, Ng argues that fulfilling first-best conditions piecemeal is optimal whenever the policy maker's information is insufficient to determine the direction of the change in the variable under consideration that will raise welfare, irrespective of the conditions in that market. We argue: (1) that Ng's own assumptions imply not that first-best conditions should be established under these circumstances, but that the status quo should be maintained; (2) that when Ng's key assumption is altered to be empirically relevant, all policy decisions become fully context-specific; (3) that Woo's argument for accepting Ng's conclusions in spite of point (2) is incorrect. The conclusion discusses valid uses of piecemeal welfare theory in spite of second best.

Key Words: second best, third best, relation function, piecemeal policies, distortions.

JEL CLASSIFICATION: D60, D61

GENERALITY VERSUS CONTEXT-SPECIFICITY:
First, Second and Third Best in Theory and Policy[1]

One of the most enduring conflicts in economics is between those who believe that the more general a theory the better it is and those who believe that to be of practical use in most instances theories need to be tailored to specific contexts. Hodgson (2002) points out that the issues of the applicability of highly general theories, and of how much specificity is required for satisfactory theoretical explanations of actual phenomenon, was hotly debated by the 19th and early 20th century historical and the institutional economists in both Europe and the US.

The debate between those who argue for the value of generality and those who argue for the need for context specificity has been prominent in discussions of economic policy. General equilibrium theories in the Arrow-Debreu tradition, and the first and second fundamental theorems of welfare economics provide a highly abstract version of a market economy. Many who believe in the value of such theories hold that these welfare theorems provide a useful defence of the free market system and a basis for policy advice. In contrast, those who believe in the need for context specificity argue that these are empty theorems that provide no useful guidance for policies meant to be applied in any actual market-oriented economy. For example, Blaug (2009) argues that the push for increasing generality is equivalent to a push for less and less applicability to particular issues.[2]

One strand of non-context specific policy advice was based on the assumption that community welfare can be increased by establishing the first-best conditions for a global Paretian optimum in any one individual market. If so, all that would be needed for a welfare-increasing policy change would be to know the present state of the market under consideration and the first-best conditions for that market. The prevalence of the one-size-fits-all policy advice of removing ‘distortions’ whenever they are found shows that this brand of policy advice is still commonly offered.[3]

The theory of second best established that piecemeal satisfaction of any one first-best optimality condition is not sufficient to increase community welfare in a world in which first-best conditions are not achieved globally. Given that the world in which we live contains many sources of departure from first-best conditions, many of which could not be removed by any practical economic policy, it follows, according to second-best theory, that there are few, if any, scientifically derivable general rules for developing piecemeal policies that apply to all market economies at all times. Instead, specific knowledge of the market in question, and its relations to other markets, is needed to establish that a policy change will *necessarily* increase the whole community's welfare. Furthermore, the theory applies not just to welfare economics but to all theories that concern the maximisation of any objective function: piecemeal satisfaction of some

[1] This paper is a revised version of my Simon Fraser University Department of Economics Working Paper 12-02 “A Critique of Ng’s Third-Best Theory” February 2012. I am indebted to Robin Boadway, Kenneth Carlaw and Jessie Joyce for comments and suggestions on that and this paper.

[2] See Blaug (2007) for a full discussion of these opposing views.

[3] For two of the many examples documenting and criticising the common use of such one-size-fits all policies see Griffiths (2003) and Stiglitz (2002).

first best rules when others cannot be satisfied will not necessarily increase the value of that function. Thus the theory of second best supports those who argue in favour of the need for context specificity.

In a frequently referenced article, Ng (1977) attempts to qualify this general result of second-best theory by developing what he calls third-best theory. Specifically, he purports to prove that fulfilling first-best conditions is the best available policy when policy makers are in a state of ‘informational poverty’ and neither first- nor second-best global optima can be achieved. Informational poverty is defined as a situation in which policy makers do not have enough information to tell them in which direction they should seek to move the variables under their control in that market, such as raising or lowering the market price through a specific tax or subsidy. Since there are undoubtedly many such markets, the advice to maintain or establish first-best conditions applies, if not with full generality, at least to many markets without any knowledge of their specific characteristics. This proposition can be, and has been, taken to advise establishing first-best conditions in all of those markets in which there is no apparent reason to depart from them. In other words, first-best conditions are the base from which one should depart only when there are strong reasons to do so.

The following are some of the many authors who have cited Ng in support of their advocacy of first-best rules in situations in which second-best optima cannot be achieved. Ebert (1985:264) argues that "first-best results can be reasonable approximations when prices are distorted". Brennan and Buchanan (1980:213) state that "…if the complement-substitute relations are not known, uniformity of rates (the first-best condition) is to be preferred". A report by Australian Government Productivity Commission (2008:21) argues that when the first best is unattainable due to many unalterable "distortions" going for their first best and ignoring other distortions will be “…close to the mark". Maks (2005:217) argues that in situation of informational poverty "…the expected value of welfare is maximised by partial realization of the 'first-best' optimum conditions" while under informational scarcity (we know in which direction the second best lies but not how far away it is) "... it is not too far from optimal to equate the price to marginal cost as the average in the economy". Woo (2010:287-88) argues that when "...we do not know the direction and degree of departure of the second-best optimum from that resulting from the application of the first-best rule [in one particular market]...the third-best policy …is not to depart from the first-best rule." Ng, himself, uses his argument about the relevance of first-best conditions to third-best situations in a number of articles (Ng 1984, 1987a, 1987b, 2000) and repeats it with some extensions in his book, Ng (2004).

This literature reveals an important conflict concerning appropriate policy advice. Are Lipsey and Lancaster right in arguing that the specific context in which a policy is to be instituted in any one part of the economy needs to be known in order to judge the direction of its effect on any objective function, including the welfare of the whole community? Or is Ng right in arguing that there is a general presumption in favour of applying first-best rules piecemeal in all those situations in which there is no strong reasons for doing otherwise, and this without knowing anything more about the specific markets in which that rule is to be applied?

Part I of this paper repeats the relevant parts of Ng's analysis. Part II argues that, even if we accept all of Ng's assumptions, his conclusion that first-best policies are the preferred ones in third-best situations of informational poverty does not follow. Instead, the correct implication of his own assumptions is that the status quo should be maintained, whatever it might be. Part III, criticises one of Ng's key assumptions and argues that when it is replaced by one that is closer to reality, there is no general *a priori* presumption for adopting any specific piecemeal policy, including maintaining the status quo. Part IV considers and rejects Woo's defence of Ng's third-best theory against the above types of criticism. Part V concludes with some general observations concerning the ways in which piecemeal welfare theory can be correctly used in spite of the theory of second best.

At the outset, some relevant terms need to be clarified. This paper follows Lipsey (2007:352) in his use of the term "sources". He writes:

> "Factors preventing attaining an efficient resource allocation are variously called 'constraints' or 'distortions.' Since neither of these terms cover everything that follows, I use the term "sources of divergence," *sources* for short. I define these as anything that if introduced on its own would prevent the achievement of a perfectly competitive, price-taking equilibrium that was Pareto efficient and otherwise attainable."

Ng (1977: 3) defines a second-best situation as one in which "...some second-best distortion is present but costs of information, etc. are negligible." In such a state, he argues, those markets in which there are no unalterable distortions can be manipulated to establish the second-best optimum. He then defines third-best situations as obtaining when both "...distortional and informational costs exist."[4] In such a situation, he argues, the second-best optimum cannot be achieved and third-best rules are needed.

This usage contrasts with that of Lipsey and Lancaster. For them: "A 'second-best situation' refers to *any* situation in which the first best is unachievable. The 'second-best optimum setting' for any *source* refers to the setting of that *source* that maximises the value of the objective function, given settings on all the other existing sources." (Lipsey 2007:352). So when Lipsey and Lancaster speak of a second-best situation in which the second-best optimum is unattainable, Ng would speak of a third-best situation. Nothing of substance depends on which terminology is used, as long as one is clear about what is referred to by each term.

I. NG'S ANALYSIS.

Ng draws a curve, F^1 that he calls a 'relation curve' and that "...relates the value of the objective function to the direction and degree of divergence from the first-best rule of the variable under consideration, or relation curve for short" (Ng, 1977: 2). For concreteness, I will let this variable source be an ad valorem tax on good Z, t_z, the objective function be community welfare, W, and where a particular parametric source is to be considered, it will be a tax, t_y, on good Y. (Of course, the source could be any cause of divergence from the first-best situation, such as some degree of monopoly, and the objective function anything, such as the amount of pollution to be removed from a city's air.) Ng's argument is illustrated in the accompanying figure that is similar to his Figure 2 but with different labels.

It is critical to note that the relation curve shown in Ng's Figure 2, and as F^1 in the present figure, is maximized when the divergence of the source, t_z in this case, is zero. i.e., the first-best rule is fulfilled. Thus there is a critical implicit assumption in Ng's analysis that the rest

[4] This is not the place to debate Ng's implied view that, given the existence of 'sources' that prevent the attainment of a first-best optimum, the only thing that prevents the attainment of a second-best one is the absence of full and costlessly available information. Lipsey (2007) argues otherwise.

of the economy also obeys its first-best rules so that there is an economy-wide, first-best optimum allocation of resources when the one variable source that is under consideration is set at its first-best value. Ng goes on to state "...it is reasonable to expect that the relation curve is concave. As we diverge more and more from the first-best rule, the marginal damage increases (1977: 3)." For now, we accept this concavity assumption in order to study Ng's analysis on its own terms, but we will reject it in Section III.[5]

Ng next introduces a source in some market other than Z, t_y in our example. Under what he calls conditions of "informational poverty," policy makers know neither in which direction nor by how much the second-best setting of the price in market Z now diverges from its first-best setting. So it is equally likely that the relation curve will have shifted to the right as to the left, as shown by the two solid curves F^2 and F^3 in the figure. Ng argues that the curves F^2 and F^3 are drawn as symmetrical because "… we do not know the sign of the skewness, if in fact they are skewed." Note that once the first-best, economy-wide solution is not achievable, each relation curve reaches its maximum at the second-best setting for the source in question, either t_z^sor $t_z^{s\prime}$ in the figure, depending on which way the new parametric tax, t_y, has shifted the relation curve for good Z.

If the policy maker knew the relation curve, he could impose a tax or subsidy on Z to move its market to its second-best position. If he knew only in which direction the maximum point on the new curve lay he could make at least a small move in that direction by departing from the first-best setting for market Z and be sure of making a gain. But if the policy maker is in a situation of informational poverty and regards it as equally likely that the relation curve has moved to the left as to the right, the best policy is, according to Ng, to stay put at what was the first-best position. This is because the concavity of the relation curve implies that the expected sign of the change in the objective function for any move is negative. Say that he makes a small departure from the first-best position for market Z by altering the value of the tax to t_z' . If the second-best relation curve is in fact F^3, he gains the amount w_1 but if it is in fact F^2, he loses the amount w_2. By the concavity assumption $w_1<w_2$ so that the expected value of the change in the objective function is negative.[6] From this, Ng concludes that the third-best policy is to remain at the first-best position for market Z, and hence, by repetition of the argument, in each market in which the setting of the source can be varied.

II. THE STATUS QUO RATHER THAN THE FIRST-BEST CONDITION[7]

But there is a catch. Ng has considered a situation in which it is implicit that an economy-wide first-best optimum exists originally. One parametric source is then introduced into one market, $t_y \neq 0$ in our example, and the question is asked: "Should the other first-best conditions

[5] This argument requires that the objective function provides a cardinal measure, not just an ordinal one.

[6] Since the two curves, F^2 and F^3, represent alterative situations, Ng's point can be made without the additional assumption that the two curves have identical shapes. When the parametric source is introduced, the policy maker does not know which way the relation curve has shifted. Let her consider changing the variable source either to the left or the right of the zero point. If the curve is F^3, the balance of expected losses over gains can be inferred from the convexity of F^3. Similarly, if the curve turns out to be F^2, the negative expected balance is inferred from the concavity of F^2. This argument is independent of the relation between the two F curves as long as they are both concave over their relevant sections.

[7] Lipsey (2007), misses this critical point.

be departed from in other markets?" But this is not a situation that faces any real-world policy maker. Instead, there are many existing sources acting in many markets. So the initial situation facing any actual policy maker must be one in which neither a first-best nor a second-best optimum obtains and the policy maker asks: "Should I alter the magnitude of the source in question, t_z in our example, or leave it unchanged?" Given this policy-relevant question, it becomes obvious that Ng's analysis applies to any change from the initial value of the source whatever that value may be. Say, for example, that the tax on commodity Z is currently t_z^c, in the figure while its relation curve is F^3. The second-best setting of its tax is t_z^s, given all the settings of all the other sources that are in operation. But the policy maker does not know in which direction the second-best setting lies. If he guesses correctly and makes a small move to toward t_z^s, he gains some amount, but if he guesses incorrectly and makes a move of equal absolute size in the other direction, he loses a larger amount.. Thus by the assumptions of informational poverty and the concavity of the relation function, the expected value of a small alteration in t_z, (or any other source) is negative, whatever it initial value.

So Ng's argument does not establish a presumption for establishing the first-best conditions piecemeal under conditions of informational poverty. Instead it establishes a presumption for staying where one is, whatever one's current position. *It is an argument for maintaining the policy status quo, not for imposing first-best rules in third-best worlds.*

III. THE CONCAVITY ASSUMPTION[8]

Now consider Ng's "reasonable" assumption that the typical relation curve is concave, as shown in the figure. Ng supports his concavity assumption by considering the market for a single commodity arguing that "...we have concavity if the algebraic slope of the demand curve is everywhere smaller than that of the marginal cost curve." This argument is valid if the objective function concerns the welfare to be derived by trading only in that one market. In this case, the demand curve can cut the price axis implying that the value of the local-market welfare function can be reduced to zero.

But welfare analysis that seeks to derive optimum conditions for the whole economy must use some objective function that covers all markets, such as the summation of all consumers' and producers' surpluses, or community indifference curves, or a Samuelsonian community welfare function. Also, to study most second-best issues, there must be *at least* three markets: one that is uncontrolled, one that has an unalterable source, and one in which the setting of the source can be manipulated by public policy.[9] As Lipsey (2007) has pointed out, in all such cases, Ng's concave relation curve implies the empirically impossible implication that a large enough setting of a source in one single market, such as a high enough tax on peanuts or fuel oil, can drive community welfare to zero. Consideration of this empirically impossible situation tells us that, even if the relation curve is concave near its maximum point, it must go through at least one point of inflection and eventually become horizontal, once the source has reached its

[8] Lipsey (2007) does make this point and it is the basis of Woo's (2007) criticism of Lipsey discussed on Part IV.

[9] For some cases, two markets are sufficient but for taxes, subsidies and other sources that alter market prices, three markets are needed. If there are only two markets and in one price exceeds marginal cost by *x* per cent, a first-best situation can be achieved if the policy maker sets the price in the second market also to exceed marginal cost by *x* per cent. But if there is a third market in which competition makes price equal to marginal cost, the policy maker cannot establish a first best optimum by any manipulation of the price in the second market only.

maximum welfare-reducing setting. If, for example, the source is a tax on one commodity, the horizontal position is reached once consumption of the commodity falls to zero, at which point the community's overall welfare will, of course, not be zero.[10]

So in cases of informational poverty when the policy maker knows neither the second-best maximum nor whether the relation curve is convex or concave at the existing setting for the source in question, there is no general presumption for gain or loss from making a small deviation from the existing value of that source. If the economy is in the range of concavity of the relation function, the expected value of a small change is negative while if it is beyond that point, the expected value of a small change is positive.

IV WOO'S CRITIQUE

In a recent paper, Woo (2010) follows Ng in implicitly assuming a situation in which first-best conditions are fulfilled in all but one market and the policy maker asks: What is the expected value of deviating from the first-best rule in any one of the other markets? Woo then argues that if Lipsey (2007) is right in maintaining that the relation curve may have a point of inflection,[11] this implies that the third-best policy of fulfilling first-best rules "...still applies for non-drastic deviation but not for drastic deviation." (Woo, 2010: 290)

To consider this argument, begin with an economy at its first-best position. Let the relation curve be concave over a range around its maximum point but eventually go through a point of inflection at some point on both sides of that value. (To prevent our figure from being cluttered unnecessarily, only the relevant convex portions of the two possible shifted relation curves are shown in the figure. For example the F^3 curve follows the solid line to the left of its maximum point at t_z^s until it reaches the dashed line labelled $F^{3'}$, which it then follows. Similarly, the F^2 curve goes to the right along the solid line starting from its maximum point at $t_z^{s\prime}$ until it reaches the dashed line $F^{2'}$, which it then follows. Now introduce a single *small* parametric deviation of one source, t_y in our example, from its first-best value. The policy maker does not know which way the relation curve for good *Z* has shifted, but she would expect the shift in either of the possible new curves F^2 or F^3 (or $F^{2'}$ and $F^{3'}$ if there is a point of inflection), and in their maximum (now second-best) values, also to be small. Since t_y can be made arbitrarily small, it follows that there exists a small enough change in t_y so that the relation curve will be convex at the zero point of t_z. In this case Ng's argument holds. The expected value of departing from the first-best condition for *Z* is negative. But if we make the parametric deviation of t_y large enough, we can shift the relation curve for *Z*, and its second-best maximum point, far enough to make its non-convex portion pass through the point $t_z = 0$, as with the dotted curves $F^{2'}$ and $F^{3'}$ in the figure. In this case, Ng's argument does not hold. So the argument is that in a

[10] Indeed, there is no obvious reason why the curve should have only one point of inflection − especially when we consider the large number of different sources that are typically operating to cause myriad divergences from first-best optimum conditions. For example, Lipsey (2007) lists nine broad classes of sources that typically exist in static situations, each one of which can contain many different individual items; and there are several additional classes that can operate in dynamic situations. Thus, until proven otherwise, we must assume that multiple inflection points are possible in many situations. All that we can say is that, assuming the curve to be concave near its maximum second-best optimum point, there must be at least one point of inflection and that if there is more than one such point, there must be an odd number of them so that the partial derivative of the objective function with respect to the setting of the one source being manipulated will eventually approach zero.

[11] If it is concave around maximum point that occurs at the second-best optimum, it *must* have a point of inflection.

two-distortion world, if the parametric distortion is such that the second-best optimum for the variable distortion is close to zero, the relation curve will be concave at the zero point making the expected value of a small change in the variable source negative.

Woo argues that "although there is no guarantee that the curve must be concave,…in the absence of precise information, concavity over the relevant domain can be considered as an average case".[12] He goes on to conclude that first-best and second-best policy should be adopted based on information availability. If we can remove all `distortions` and know enough, we can move to the first-best optimum; if we cannot remove all `distortions` but know enough, we can move to the second-best optimum; if we are in informational poverty, third-best theory tells us that we must adopt first-best rules piecemeal whenever they are available and this is "…the useful piecemeal policy that Lipsey is in favour of."

The third best rule as described above by Woo is context specific only in the senses that it is meant to apply in contexts in which first- and second-best optima are unattainable (which is almost always) and the policy maker is in a situation of informational poverty (which may be assumed to be a frequent occurrence). It is general in arguing that in all such situations first-best conditions should be adopted piecemeal. But this is not the sort of genuinely context-specific policy that Lipsey advocates and that is summarised in the final section of this paper. We agree that Ng's argument holds for the case of one small deviation of one parametric source from its first-best setting. However, as we saw in Section II, this does not describe the typical situation that faces real policy makers: all first-best conditions except one are satisfied and she considers departing from one other first-best condition.

Instead of Ng's and Woo's text-book world, real policy makers find themselves in a world in which there are many sources, some small, some large, and many that cannot be removed. To follow Ng's and Woo's advice in such situations, they must make a discrete change in the source in question from its present to its first-best setting.

In this context, there is another possible argument which holds that if the deviation of the variable source from its first-best setting is small enough, going to that first-best setting has a positive expected value. But to know the expected value of moving from any existing non-zero setting of that source to the first-best setting, one has to evaluate the objective function at both of those settings. We analyse this situation in the figure assuming that the second best value of the t_z is positive and using the concave form of the relation function (which merely means that if there is a point of inflection, it is to the right of. i.e., higher than, t_z^c). An exactly parallel argument applies when the second best value of t_x is negative giving rise to a reaction function such as F^2. If the value of the variable source is less than the critical value, t_z^c in the figure, its removal to establish the first-best condition will lower the value of the objective function. Only if the value *exceeds* t_z^c will its removal increase the function's value. Assuming that the relation curve for each source is concave near its first-best setting, establishing the first-best condition for one variable source will only improve matters if the value of the source is initially far enough away

[12] Since in a real world setting the variable source will not be at its second-best setting, there can be no general presumption for either convexity or concavity of the relation curve in the neighbourhood of the existing value of that source.

from its first-best setting. The smaller the deviation, the greater the chance that removal will lower welfare.[13]

V. FURTHER OBSERVATIONS

Rather than upsetting Lipsey and Lancaster's conclusion that to increase overall community welfare by a piecemeal policy change in one sector of the economy, the policy maker needs to have substantial context-specific empirical knowledge, Ng's analysis reinforces it, once the correct relation curve is substituted for his invalid one – and, correctly interpreted, Woo's observation does the same. The knowledge required to establish the sign, let alone the value, of the change in the objective function if we make a marginal change in the setting of the source in question, or move it discretely to the first-best setting, is context-specific and will necessarily vary from case to case.

So where does this leave welfare economics? Statements such as the following are often made as criticisms of the relevance of second-best theory: "You cannot expect us to solve the whole economy before we decide whether or not to build a bridge or open a harbour." The observation that such practical decisions are often made by applied economists without solving for the welfare effects on the whole economy is often taken to support the view that no matter how correct in theory, second-best considerations are irrelevant in practice. In reply to such arguments, Lipsey (2007) reaffirms the message of Lipsey and Lancaster (1956) that the existence of many sources that prevent the attainment of a global first best implies the absence of any scientifically derivable, non-context specific policy that ensures an increase in the welfare of the whole community. He then argues that many policy decisions that face applied economists concern much less general objective functions than a community welfare function. For example: "Which of the many alternative schemes—regulations, cap-and-trade, or a carbon tax---will achieve a given amount of pollution for the least cost?" or "Where should we build a bridge so as to minimise traffic congestion?" These, and many other such examples, have the common aspect that the objective functions are much more focussed and hence more context specific than that of maximizing the whole community's welfare. When context is specified, as in the above examples, welfare analysis of policy alternatives is of enormous value.

[13] To check the general argument in the text, several numerical examples were considered. A typical one was as follows: production possibilities: $R = X + gY + hZ$, utility function, $U = aX^{1/3}Y^{1/3}Z^{1/3}$, a parametric tax on Y, t_y and a variable tax on Z, t_z. In this case for $t_y = 10\%$, the second-best value of t_z was 4.8%, while its critical value was 9.8% and the point of infection in the relation curve occurred at t_z=105.9%. Similar results were obtained using an additive utility function, $U = aX + bY + cZ$. So establishing the first-best condition for good Z lowers welfare for any value of the tax on Z up to just less than the parametric tax on Y. The point of inflection occurs in this case at quite a high tax rate. So although this result illustrates the existence of a point of inflection, it occurs at a tax rate that would be of little practical value. However, this is a very simple case in which there are only three commodities, which are of equal value to the consumer and none of which can have their consumption reduced to zero by any finite tax rate. The question remains of where the points of inflection would be in other cases in which there were many commodities and many different sources of departure from first-best conditions.

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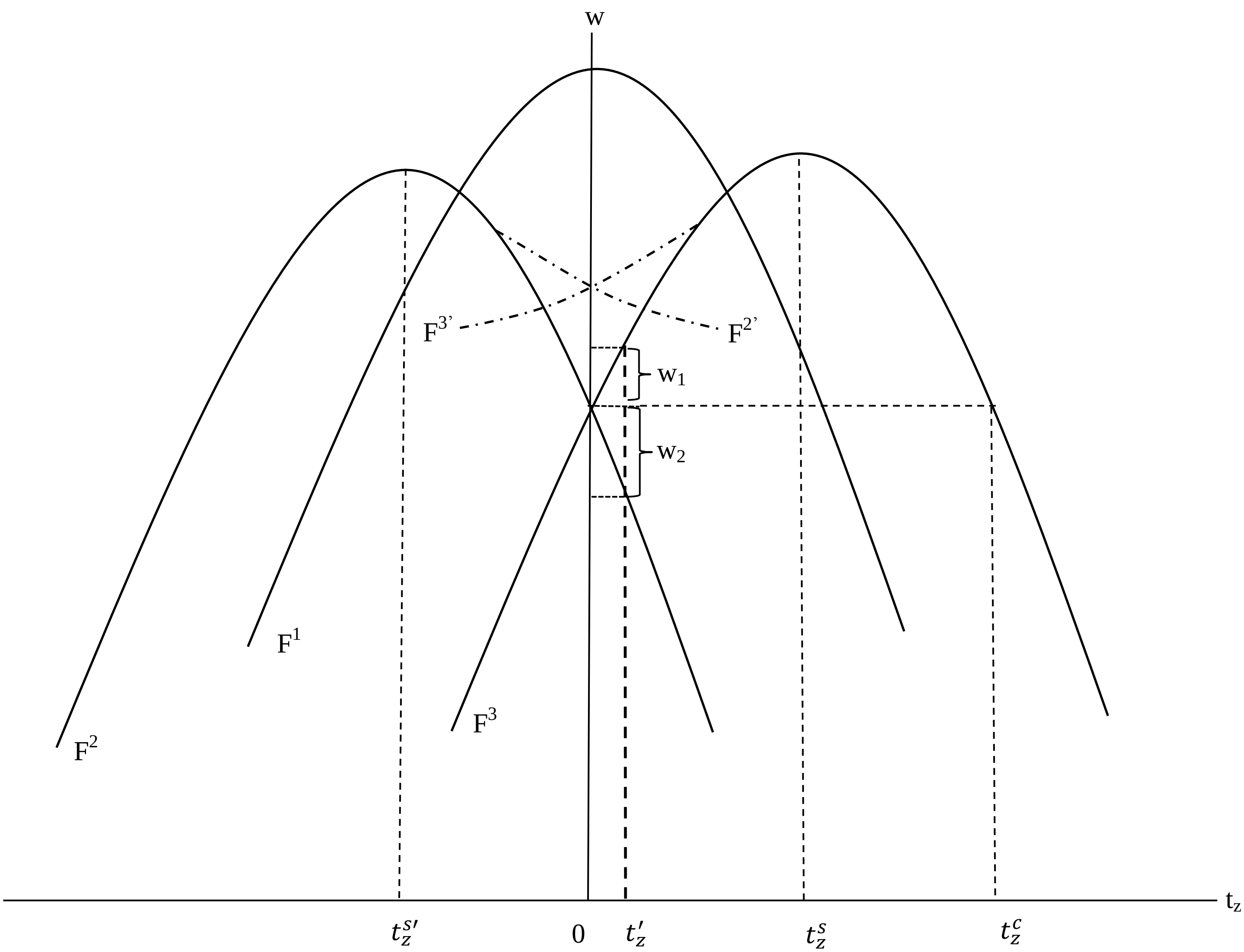

FIGURE 1

THE OBJECTIVE FUNCTIONS RELATED TO THE SETTING OF ONE VARIABLE SOURCE FOR THREE ALTERNATIVE SETTINGS OF ANOTHER PARAMETRIC SOURCE