Well-paid Nurses are Good Nurses: An Analysis of Nursing Supply Based on Determinants of Work Motivation

Alessandro Fedele
Well-Paid Nurses are Good Nurses: An Analysis of Nursing Supply Based on Determinants of Work Motivation*

Alessandro Fedele

January 2015

Abstract

Some recent health economics papers suggest that increasing wage in the nursing labor market with the aim of reducing shortage may yield a negative effect on the average productivity and/or the average motivation of applicants attracted. Some feminist economics papers criticize this inefficiency wage result on the grounds that nurses' motivation is modeled in an overly simplistic way. The current paper aims to address this criticism by considering explicitly determinants of work motivation. Relying on introductory concepts from organizational psychology and management literatures, the inefficiency wage result is shown to disappear. A pay raise turns out to have no negative effect both on the average productivity and the average motivation of applicants attracted.

Keywords: Nurses' wage, nursing shortage, nurses' productivity, nurses' motivation, inefficiency wage result, determinants of work motivation.

JEL Codes: I11, J32, B54.

*I thank seminar audience at "Internal Research Seminar Series", Free University of Bozen/Bolzano, Francesca Barigozzi, Francesco Cohen, and Pierpaolo Giannoccolo for useful comments. The usual disclaimer applies.

Faculty of Economics and Management, Free University of Bozen/Bolzano, Italy; e-mail: alessandro.fedele@unibz.it.
1 Introduction

This paper investigates the effect of a wage increase on the long-run supply of nurses, i.e., the number of nurses that will be potentially available in the future. A theoretical framework is proposed where potential nurses differ in terms of productivity and motivation and determinants of their motivation are explicitly analyzed.

The research question addressed by this paper is non-trivial because many countries around the world are seriously concerned about nursing shortage. For instance, in 2012 the US Bureau of Labor Statistics listed registered nursing and nursing assistance among the top-twelve occupations in terms of projected job openings due to growth and replacement needs in the United States, as reported in Table 1.

Table 1. Projected number of job openings in Nursing due to growth and replacement needs, 2012 and projected 2022, US (Source: the US Department of Labor, Bureau of Labor Statistics)

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Registered nurses</td>
<td>526,800</td>
</tr>
<tr>
<td>Nursing assistants</td>
<td>312,200</td>
</tr>
<tr>
<td>Registered nurses</td>
<td>1,052,600</td>
</tr>
<tr>
<td>Nursing assistants</td>
<td>593,600</td>
</tr>
</tbody>
</table>

Table 2 shows that a similar scenario of growing demand for and declining supply of nurses (and caregivers) occurs in another aging developed country, namely Italy.

Table 2. Projected number of job openings in Nursing and Caregiving due to growth and replacement needs, 2011 and projected 2016, Italy (Source: ISFOL, Istituto per lo sviluppo della formazione professionale dei lavoratori)

<table>
<thead>
<tr>
<th>Employment projected change (2011-2016)</th>
<th>Job openings due to growth and replacement needs (2011-2016)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurses (Tecnici della salute)</td>
<td>12,962</td>
</tr>
<tr>
<td>Caregivers (Professioni qualificate nei servizi personali ed assimilati)</td>
<td>80,460</td>
</tr>
<tr>
<td></td>
<td>100,056</td>
</tr>
<tr>
<td></td>
<td>439,747</td>
</tr>
</tbody>
</table>

The shortage of nurses in developed countries has an impact on developing nations as well, as pointed out by feminist economists Nancy Folbre and Julie A. Nelson (Nelson
and Folbre, 2006: 129). They remark that the United Kingdom and the United States "have failed to generate a sustainable supply of nurses." This has led both countries to "increased reliance on recruitment of nurses from developing countries." The two authors conclude that "the resulting brain drain imposes serious costs on developing countries that invest heavily in nurse education."

The above evidence seems to suggest that the goal of a sustainable recruitment and retention of nurses should be in the political agenda of all aging industrialized countries. This is why a recent health economics literature has begun to study the effect of a wage increase on the supply of nurses. Some empirical papers focus on the short-run supply, i.e., on the number of hours supplied by currently existing nurses: see, e.g., Peter I. Buerhaus, David I. Auerbach, and Douglas O. Staiger (2007) and Maria L. Di Tommaso, Steiner Strøm, and Erik M. Sæther (2009) for the case of registered nurses in the United States and Norway, respectively. Other empirical papers consider also the long-run supply of nurses. Yvana A. Chiha and Charles R. Link (2003) show that the registered nurses' wage has minor effects on both labor force participation and hours worked given participation (i.e., on the short-run supply); yet they find a significant and positive effect on the number of people who enter first-degree nursing programs in the US (i.e., on the long-run supply). A similar conclusion is drawn by Karen J. Buhr (2009), who shows that earnings have a positive effect in attracting persons who are not currently working as nurses in Canada. Finally, James Buchan and Steven Black (2011) report on four case study countries where a significant pay raise was awarded to some categories of nurses: the United Kingdom, New Zealand, Finland and the Czech Republic. These authors observe that the pay raise contributed to an increase in the potential new supply of entrants to nurse education.

A second stream of theoretical literature, which is more relevant for the purpose of the current paper, focuses on the long-run supply of nurses. Anthony Heyes (2005), Lowell J. Taylor (2007), and Francesca Barigozzi and Gilberto Turati (2012) investigate self-selection in nursing when potential applicants differ in terms of productivity and motivation. These analyses confirm that raising wages, together with funding additional undergraduate places at universities, helps mitigate the shortage problem by attracting more applicants to the nursing career.
Yet Heyes (2005) shows such a “simple” recipe might entail an undesirable side-effect. His analysis hinges upon two crucial hypotheses. Firstly, he supposes that being motivated nurses is a necessary and sufficient condition for being productive nurses. Secondly, he models motivation in a rather simplistic way by assuming that motivated nurses receive a non-pecuniary “motivational” benefit on top of a flat monetary wage. By contrast, any alternative job potential applicants have access to is supposed to be “non-motivational”, in that it cannot provide any motivational benefit. On these theoretical grounds, Heyes (2005) shows that increasing wages turns out to reduce the average motivation, hence the average productivity, of applicants attracted. The reason is that motivated individuals require a lower minimum wage to enter nursing, i.e., a lower reservation wage, than non-motivated thanks to the motivational premium. Heyes (2005) concludes that a pay raise might not be an appropriate solution to the issue of nursing shortage. Taylor (2007) uses the Heyes’ framework and confirms the existence of this inefficiency wage mechanism. Yet he finds conditions under which a pay raise affects positively utilitarian welfare.

When assimilating aim (being motivated) to achievement (being productive), Heyes (2005) and Taylor (2007) embrace the mainstream economics approach according to which, as pointed out by Julie A. Nelson (2011: 6), "looking after someone ... is often thought of as requiring no special skills". In other words, Heyes (2005) and Taylor (2007) assume that skills are not crucial to be good nurses. This is the first important shortcoming of their analysis. Indeed, motivation is important but by far not sufficient to guarantee productivity in nursing, as argued, e.g., by Nelson and Folbre (2006).

Feminist economists Valerie Adams and Julie A. Nelson (Adams and Nelson, 2009) observe that registered nurses’ job requires significant skills. They provide a comprehensive description of what registered nurses do based on the combination of four aspects: on one hand, tasks that involve thinking and talking (which they label as “mind”) and physical proximity and touch (“body”); on the other hand, tasks related to acquired information and expertise (“knowledge”), and to (Adams and Nelson, 2009: 13) "a willingness to take a compassionate interest in the well-being of another person - ‘virtue’." Mind-knowledge aspects, i.e., the use of scientific and medical knowledge in patient care, represent masculine-associated aspects according to the conventional economic analysis. The
two authors remark that mind-knowledge aspects are sometimes recognized as necessary to nursing, in which case they are also financially rewarded. Yet the other combinations of the four aspects, which contain "a whiff of feminine “softness”" (Nelson, 2011: 6), are generally hidden or considered intrinsically rewarding and therefore not economically rewarded by healthcare reimbursement systems. Nelson (2011: 8) confirms that these aspects "have been cloaked by invisibility by being associated with women and “naturally” arising behavior."

Both the importance of skills in nursing and the financial acknowledgement of nurses’ work have been introduced in the Heyes’ framework by Barigozzi and Turati (2012). They relax the hypothesis that only motivation matters for productivity, with the effect that both more motivated but less productive and less motivated but more productive potential nurses are present in the population. In addition, Barigozzi and Turati (2012) assume that reservation wages of potential nurses depend not only (negatively) on their motivational premium, but also (positively) on their productivity.

Barigozzi and Turati (2012) find that the Heyes’ inefficiency wage mechanism is less likely to occur. More precisely, they consider separately registered nurses and nursing assistants on the basis that the productivity aspect matters more (less) than the motivational aspect (and the motivational premium) for registered nurses (for nursing assistants). This is because only registered nurses graduate from a nursing program and often have to pass a licensing exam. On these grounds, registered nurses’ reservation wages become increasing in their productivity because the positive effect of productivity on reservation wages is larger than the negative effect of the motivational premium, while this is not the case for nursing assistants. Barigozzi and Turati (2012) conclude that a pay raise impacts positively on the average productivity of registered nurses, but ambiguously on the average productivity of nursing assistants and negatively on their average motivation.

A possible policy recommendation based on the above findings could be that a wage increase may be appropriate to solving the shortage of registered nurses but probably less applicable in the case of nursing assistants. This policy recommendation may be problematic as shortage of nursing assistants and, more generally, of paraprofessional long-term care workforce appears to be particularly dramatic due to hard working conditions,
heavy workloads, and, especially, low wages and benefits (Robin I. Stone and Joshua M. Wiener, 2001). For instance, in 2012 the median wage of nursing assistants in the United States, $24,420 (source: the US Bureau of Labor Statistics), was lower than the overall median wage, $27,519.10 (source: the US Social Security Administration), therefore ranking nursing assistance among the lowest-paid professions.

There is a second important shortcoming in Heyes (2005) and Taylor (2007), which is not addressed by Barigozzi and Turati (2012) and could be responsible for their results concerning selection of nursing assistants. As stressed by Nelson and Folbre (2006) and Adams and Nelson (2009), nurses’ work motivation is treated in an overly simplistic way, its only effect being a reduction of reservation wages. The reasons that motivate care activities, in general, and nursing, in particular, have been investigated by feminist economists following the lead of Nancy Folbre (1995), who identified reciprocity, altruism, and responsibility as crucial determinants of caring work. For instance, in a recent contribution, Valerie Adams and Rhonda Sharp (2013) examine reciprocity and, on the basis of qualitative studies in Australian residential aged care sector, develop the notion of professional reciprocity as a motivation for caring work and a mean of improving quality care.

With the aim of addressing the criticism raised by Nelson and Folbre (2006) and Adams and Nelson (2009), the current work tries to deepen the analysis of nurses’ motivations. Barigozzi and Turati’s (2012) contribution is extended in the following manner. Hinging upon introductory notions from organizational psychology, determinants of work motivation are introduced explicitly to understand why and how potential nurses can be motivated: see the next section for further details. By doing so, the inefficiency wage mechanism highlighted first by Heyes (2005) is shown not to occur. Well-paid nurses turn out to be good nurses. More precisely, a pay raise impacts positively on the average productivity of both registered nurses and nursing assistants. In addition, the effect on the average motivation is never negative, in a sense which will be made precise. A natural conclusion is that raising wages may help mitigate the problem of nursing shortage because not only more but also better applicants turn out to be attracted.
2 Work Motivation

Theories of human motivation have their roots in applied psychology. Self-determination theory, among the most influential theories of human motivation, develops the classical concept of *intrinsic motivation*, defined by Edward L. Deci and Richard M. Ryan (1985) as the doing of an activity for its inherent satisfactions, rather than for some separable consequence. Richard M. Ryan and Edward L. Deci (2000: 56) argue: "Intrinsic motivation exists in the relation between individuals and activities. People are intrinsically motivated for some activities and not others, and not everyone is intrinsically motivated for any particular task."

When the activity at stake is a job, intrinsic work motivation is the relevant concept, which has been investigated by organizational psychologists and management scientists. Intrinsic work motivation is affected by both workers' and job characteristics (see, e.g., Jed DeVaro and Dana Brookshire, 2007). This gives scope to the notion of *person-job fit*, P-J fit henceforth, which is defined as the match between the needs/desires of a person and what is provided by a job (Jeffrey R. Edwards, 1991) and can be considered the main determinant of intrinsic work motivation.

Ryan and Deci (2000) observe that other reasons for actions exist which are driven by something else than material incentives such as money or career advancements. These reasons are referred to as autonomous forms of extrinsic motivation. The most autonomous of such forms is called *integration* by Ryan and Deci (2000). Integrated motivation refers to external reasons to engage in an activity that have been internalized by an individual; this is why the motivation is considered autonomous. In case of integrated work motivation, a job is valued by a worker not because it is intrinsically appreciated, rather because it helps satisfying a social value like, e.g., help people in need, which represents a separable consequence but has been internalized by the worker. In that case, the worker is stimulated more by the organizational mission than by the pleasure found in doing the work itself (Adam M. Grant, 2008). Consequently, integrated work motivation is affected by *person-organization fit*, P-O fit henceforth, defined as the compatibility between workers and organizations in terms of value congruence (Victor R. Tom, 1971).
The conceptual difference between P-J fit and P-O fit can be summed up as follows. P-J fit is related to an individual’s compatibility with a specific job: the individual likes intrinsically the job. P-O fit is not necessarily related to a specific job. Rather, it pertains to how an individual matches an organization’s values, goals, and mission: the individual believes in the organizational mission (Kristy J. Lauver and Amy Kristof-Brown, 2001).1

There is empirical evidence that workers are able to distinguish between fit with their job and their organization, and that the job content affects the perception of which fit is more relevant in enhancing motivation: see, e.g., Lauver and Kristof-Brown (2001) who conducted a survey on office personnel and drivers of a national trucking company. Accordingly, the type of fit that motivates a worker may depend on her/his specific occupation. In the case of nursing, tasks performed by registered nurses may be considered more interesting than those carried on by nursing assistants because the former require higher skills. One may therefore infer that motivated registered nurses are more likely to be stimulated by the job content. By contrast, motivated nursing assistants are more likely to perceive a fit between their social values and the general mission of hospitals, that is helping people in need. On this basis, in the current paper P-J fit (P-O fit) is supposed to be the main determinant of motivation of registered nurses (nursing assistants).

The above insights along with the following reasoning may help understand why incorporating determinants of work motivation leads to a different result concerning the average productivity of nursing assistants attracted than that found by Barigozzi and Turati (2012). Potential applicants in Heyes (2005), Taylor (2007), and Barigozzi and Turati (2012) are rational in that they choose the labor sector where they get the highest benefits, both pecuniary and non-pecuniary. If a nursing assistant is mainly motivated for she/he perceives P-O fit, she/he values her/his job not (only) because she/he likes it intrinsically, but especially because she/he works in a hospital which matches her/his social value of

---

1Heyes (2005), Taylor (2007), and Barigozzi and Turati (2012) use the term “vocation” to describe motivation of nurses. In the light of self-determination theory, it is interesting to note that Heyes (2005: 561-562) seems to take vocation to be a state of both intrinsic work motivation and autonomous extrinsic work motivation. He first defines persons with a vocation for nursing as persons doing the job “because they like doing it”, that is a state of intrinsic motivation. He then argues this definition is based on standard definitions and mentions the Longman’s Dictionary definition, according to which vocation is "a job you do because you have a strong feeling that doing this job is a purpose of your life, especially because you want to help other people." This is a state of autonomous extrinsic motivation because “helping other people” is a separable (though internalized) consequence.
helping people in need. In that case, a rational agent could seek an alternative career in
an alternative organization which helps people in need, e.g., a work integration social en-
terprise, thus keeping a similar level of motivational premium. This turns out to increase
the minimum remuneration motivated individuals require to work as a nursing assistant,
with the effect that reservation wages of all potential nursing assistants become increasing
in their productivity and a pay raise impacts positively on their average productivity.

This result is obtained because the current paper, unlike Heyes (2005), Taylor (2007),
and Barigozzi and Turati (2012), considers determinants of work motivation and does
not confine workers’ self-selection choices to a dichotomy between nursing and a non-
motivational job, such as miner or supermarket cashier. By doing so, it is acknowledged
that the outside option of rational (and motivated) workers consists in their best alternative
available job; in the above example, a job in a work integration social enterprise that, unlike
a non-motivational job, provides an individual stimulated by P-O fit with a motivational
premium.

3 Basic Framework

Consider a hypothetical nursing market where potential applicants are endowed with two
dichotomous characteristics: (i) productivity, whose level is measured by parameter \( q_i \in \{q_L, q_H\} \), with \( q_H > q_L > 0 \); (ii) motivation, whose level is represented by parameter \( v_j \in \{v_l, v_h\} \), with \( v_h = v > v_l = 0 \). The following four types of potential applicants
thus exist: type-\( Hh \), endowed with parameters \( q_H \) and \( v_h \), which we refer to as productive
and motivated; type-\( Hl \), productive and non-motivated; type-\( Lh \), non-productive and
motivated; type-\( Ll \), non-productive and non-motivated. Each individual observes only
her/his own type, i.e., productivity and motivation are private information. All nurses
receive a wage \( w \) independent of their type, i.e., a flat wage. In addition, parameter \( v_j \)
corresponds to a motivational premium, i.e., the monetary equivalent of an extra-benefit
they get when working as a nurse.

Heyes (2005) assumes that motivation guarantees productivity. This amounts to
say that each motivated nurse is productive, whilst each non-motivated nurse is non-
productive. Put it differently, only type-\( Hh \) and type-\( Ll \) potential applicants are present.
All potential applicants have an outside option which pays $r$.

The key notion in the Heyes’ model is the reservation wage. This is defined as the wage level for which potential applicants are indifferent as to whether to accept the nursing job or the outside option. The values of type-$ij$ potential applicants’ reservation wages, denoted by $w_{ij}$, are obtained by solving equality $w + v_j = r$ by $w$, where $w + v_j$ is what a type-$ij$ earns when working as a nurse and $r$ when working elsewhere. In symbols, $w_{ij} = r - v_j$.

Since $v_h = v > v_l = 0$, it is worth remarking that $w_{Hh} = r - v < w_{Ll} = r$. Productive and motivated nurses, type-$Hh$, turn out to have a lower reservation wage than non-productive and non-motivated, type-$Ll$. This is because the former enjoy an extra motivational benefit when working as a nurse. On this basis, Heyes (2005) studies the effect of wage level $w$ on the number of actual applicants (i.e., the long-run supply of nurses) and on the average productivity and the average motivation of the pool of actual applicants, i.e., of active nurses. His findings are summarized in the following

**Proposition 1** (Heyes, 2005) The long-run supply of nurses is increasing in the wage, while the average productivity and the average motivation of active nurses is decreasing in the wage.

The reason for these findings is straightforward. Paying at least $w_{Hh}$ but less than $w_{Ll}$ attracts only type-$Hh$ applicants. Increasing wage to at least $w_{Ll}$ attracts type-$Ll$ as well, with the effect that long-run labor supply increases. Yet this positive effect on labor quantity must be traded-off with the negative impact on labor quality. All applicants are productive and motivated if $w$ is at least $w_{Hh}$ but less than $w_{Ll}$, in which case the average productivity (motivation) of actual applicants is $q_H (v_h)$. When $w \geq w_{Ll}$ non-productive and non-motivated type-$Ll$ applicants enter the market. As a consequence, the average productivity (motivation) decreases to a weighted mean of $q_H (v_h)$ and $q_L (v_l)$, with weights equal to the proportion of type-$Hh$ and type-$Ll$ in the pool of potential applicants.

---

2The original framework in Heyes (2005) considers a continuum of potential applicants, each one with her/his own outside option. The current simplified version is introduced for tractability but leads to the same trade-off between the supply and the average productivity of nurses attracted as in Heyes (2005): see Proposition 1 below.
Barigozzi and Turati (2012) relax the Heyes’ hypothesis that motivation guarantees productivity in nursing. Accordingly, four types of individuals are actually present in the labor market, type-$Hh$, -$Hl$, -$Lh$, -$Ll$. In addition, Barigozzi and Turati (2012) assume that the type-$ij$ potential applicants’ outside option depends on their productivity $q_i$. In symbols, $r_{ij} = q_i$. The value of type-$ij$ worker’s reservation wage is obtained by solving equality $w + v_j = q_i$ by $w$ and it is given by $w_{ij} = q_i - v_j$. One can easily check that

$$\frac{w_{Lh}}{w_{Ll}} < \frac{w_{Hh}}{w_{Hl}} < \frac{w_{Ll}}{w_{Hl}}$$

when $\Delta q > v$, \hspace{1cm} (a) \hspace{1cm} \frac{w_{Hh}}{w_{Lh}} < \frac{w_{Hl}}{w_{Ll}}$ when $\Delta q < v$, \hspace{1cm} (b)

where $\Delta q = q_H - q_L$ is the productivity gap between productive and non-productive workers. Barigozzi and Turati (2012) consider separately the two rankings in (1) to study the effect of wage $w$ on the long-run supply of nurses, the average productivity, and the average motivation of active nurses. Their findings are summarized in the following

**Proposition 2** \hspace{1cm} (Barigozzi and Turati, 2012) \hspace{1cm} The long-run supply of nurses is increasing in the wage. (i) The average productivity (motivation) of active nurses is increasing (fluctuates) in the wage when $\Delta q > v$. (ii) The average productivity (motivation) of active nurses fluctuates (is decreasing) in the wage when $\Delta q < v$.

First observe that the long-run labor supply increases with wage for more applicants are attracted as $w$ rises. This is consistent with Heyes (2005). As for the effect on the average productivity and motivation, Barigozzi and Turati’s (2012) findings are as follows. First note that type-$ij$ worker’s reservation wage, $w_{ij} = q_i - v_j$, is positively affected by the productivity level and negatively by the motivational premium. This implies that non-productive but motivated (productive but non-motivated) individuals require the minimum (maximum) reservation wage.

---

3This inefficiency wage mechanism is the main novelty of the Heyes’ analysis. The author then derives conditions under which total productivity of active nurses net of wages paid to them is maximum when a lower wage is offered, $w_{Hh}$ rather than $w_{Ll}$, so that non-productive non-motivated workers are crowded out.

4Relying on the Heyes’ inefficiency wage mechanism Taylor (2007) shows that a higher wage, $w_{Ll}$ rather than $w_{Hh}$, may be optimal when welfare instead of total productivity of active nurses net of wages, is to be maximized. Taylor adopts a utilitarian approach by defining welfare as the sum of total productivity of nurses and utility of all individuals (the latter consisting in wage and motivational premium enjoyed by nurses plus outside option enjoyed by those who decide not to work as a nurse) net of wages paid to nurses.
When $\Delta q > v$, i.e., when ranking (1-a) holds true, the productivity gap $\Delta q$ is larger than the motivational premium $v$. In other words, productivity particularly matter. Barigozzi and Turati (2012) argue that this situation fits better the market for registered nurses. The average productivity is shown to be increasing in the wage level for both productive types, $Hh$ and $Hl$, enter the market at the two highest wage threshold levels, i.e., at $w \geq w_{Hh}$ and $w \geq w_{Hl}$, respectively. The intuition for this result is simple. Unlike in Heyes (2005) workers’ productivity influences their outside options. When $\Delta q > v$ the positive effect of productivity on the value of reservation wages is larger than the negative effect of the motivational premium, with the effect that productive and motivated individuals have larger reservation wages than non-productive and non-motivated. In symbols, $w_{Hh} > w_{Ll}$. This scenario reverses the result in Heyes (2005). The average motivation instead fluctuates because motivated and non-motivated types alternate in entering the nursing market as the wage rises.

The results are different when ranking (1-b) holds true, because the motivational premium $v$ is larger than the productivity gap $\Delta q$. Barigozzi and Turati (2012) argue that this scenario fits better the market for nursing assistants, where productive and motivated individuals are shown to have lower reservation wages than non-productive and non-motivated. In symbols, $w_{Hh} < w_{Ll}$. This is similar to Heyes (2005). Yet the very existence of four types instead of two, due to the fact that motivation does not guarantee productivity, makes the results of Barigozzi and Turati (2012) different from Heyes (2005). Since non-productive but motivated individuals, type-$Lh$ (productive but non-motivated individuals, type-$Hl$) turn out to have the lowest (highest) reservation wage, the average productivity of active nursing assistants fluctuates in the wage level because non-productive and productive types alternate in entering the nursing market. The average motivation is instead decreasing since both non-motivated types, $Ll$ and $Hl$, enter the market at the two highest wage threshold levels, i.e., at $w \geq w_{Ll}$ and $w \geq w_{Hl}$. There is a negative effect of a pay raise on the average motivation.
4 Determinants of Nurses’ Motivation

An extension of Barigozzi and Turati’s (2012) framework is proposed, based on the idea that motivated (i.e., type-ih) potential nurses perceive two types of fit, P-J fit or P-O fit.

More precisely, I distinguish between registered nurses and nursing assistants by assuming what follows. Type-ih potential registered nurses are motivated mainly because they perceive P-J fit, i.e., they like their job. In this case it is proper to talk about intrinsic motivation according to Deci and Ryan (2000). By contrast, type-ih potential nursing assistants are motivated mainly because they perceive P-O fit, i.e., they believe in the organizational mission of a hospital. Here motivation is a state of integration.

In addition, I stick to the notation of Barigozzi and Turati (2012), according to which parametric interval $\Delta q > v$ ($\Delta q < v$), where the productivity gap is higher (lower) than the motivational premium, fits the market for registered nurses (nursing assistants). Table 3 summarizes the overall categorization of motivated registered nurses and nursing assistants based on the two types of fit and the two parametric intervals.

<table>
<thead>
<tr>
<th>Determinants of Motivation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motivated Registered Nurses</td>
</tr>
<tr>
<td>(parametric interval, $\Delta q &gt; v$)</td>
</tr>
<tr>
<td>Motivated Nursing Assistants</td>
</tr>
<tr>
<td>(parametric interval, $\Delta q &lt; v$)</td>
</tr>
</tbody>
</table>

4.1 Registered Nurses

This subsection focuses on the case of registered nurses. This category of nurses is characterized by a primacy of productivity over motivation; in symbols, by inequality $\Delta q > v$. Moreover, as highlighted in the second row of Table 3, the main reason why type-ih potential registered nurses obtain a motivational premium is the perception of P-J fit. In other words, they like intrinsically that specific job, i.e., there is perfect match between their psychological needs and the content provided by the registered nursing job. By definition of P-J fit, such a match is necessarily less than perfect, or even absent, when they dedicate to any different job, even the best alternative available job. Accordingly, type-ih potential
registered nurses enjoy a lower motivational premium when employed elsewhere. In symbols, their outside option is \( r_{jh}^{P-J} = q_i + v' \), where superscript P-J stands for person-job fit and \( 0 \leq v' < v \) denotes the outside motivational premium.

Bearing in mind that the outside options of non-motivated registered nurses are given by \( r_{il} = q_i \) and that a type-ij individual gains \( w + v_j \) when working as a registered nurse, in Table 4 I write the motivated and non-motivated registered nurses’ reservation wages, \( w_{ih}^{P-J} \) and \( w_{il} \), as solutions to equations \( w + v = q_i + v' \) and \( w = q_i \), respectively.

Table 4. Reservation Wages of Registered Nurses

<table>
<thead>
<tr>
<th>Reservation Wages</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Motivated Registered Nurses</td>
<td>( w_{ih}^{P-J} = q_i - (v - v') )</td>
</tr>
<tr>
<td>Non-motivated Registered Nurses</td>
<td>( w_{il} = q_i )</td>
</tr>
</tbody>
</table>

Under inequality \( \Delta q > v \), which describes the market for registered nurses, one can easily check that \( w_{ih}^{P-J} < w_{il} < w_{Hh}^{P-J} < w_{Hl} \). This ranking of reservation wages is as in Barigozzi and Turati (2012): see (1-a). The reason is as follows.

When P-J fit is considered the main determinant of motivation of registered nurses, their outside option is characterized by a lower motivational premium than that enjoyed in nursing. The effect of motivation on reservation wages is still negative but mitigated compared with Barigozzi and Turati (2012) (in symbols \( 0 \leq v - v' < v \)), hence lower than the positive effect of productivity (in symbols \( v - v' ( < v ) < \Delta q \)).

Barigozzi and Turati’s (2012) results concerning registered nurses are thus robust to the introduction of P-J fit. A pay raise may be an appropriate policy to mitigate the shortage of registered nurses because it increases both the long-run supply of registered nurses (more applicants are indeed attracted as \( w \) rises) and their average productivity. Moreover, motivated and non-motivated types alternate in entering the nursing market as the wage rises. As a result, the effect on the average motivation is not negative in that there is no scenario where both non-motivated types, \( Ll \) and \( Hl \), enter the market at the two highest wage threshold levels.

These findings are summed up in the following
Proposition 3 When P-J fit is considered the main determinant of motivation of registered nurses, the long-run supply of registered nurses and their average productivity are increasing in the wage. The average motivation fluctuates in the wage.

In conclusion, it is worth reiterating that whereas Barigozzi and Turati (2012) suppose that nurses’ outside option consists in a non-motivational job, the current approach is more general in that I do not limit their outside option to any specific category of professions. Rather, I argue that registered nurses’ fit level must be lower when they are engaged in any different job if P-J fit is the main determinant of their motivation.

4.2 Nursing Assistants

This subsection tackles the case of nursing assistants. According to Barigozzi and Turati (2012) this category of nurses is characterized by a primacy of motivation over productivity; in symbols, by inequality $\Delta q < v$. As for determinants of motivation, in the last row of Table 3 I argue that the main stimulus of type-$ih$ potential nursing assistants is the perception of P-O fit. Unlike P-J fit, P-O fit is not necessarily lower or absent when they do another job, as long as this job is accomplished within an organization sharing the same value of supporting people in need as a hospital does. Accordingly, type-$ih$ potential nursing assistants’ outside option is equal to $r_{ih}^{P-O} = q_i + v''$, where superscript P-O stands for person-organization fit and $v''$, larger than, or equal to, or lower than $v$, denotes the outside motivational premium. I assume that the difference in absolute value, if any, between the two motivational premia be small. In symbols, $|v'' - v| \to 0$. This captures the following idea. Since type-$ih$ potential nursing assistants’ motivation is affected by P-O fit and the workers’ outside option consists in their best alternative job, an outside job option in a different organization with a similar mission must exist. Accordingly, similar are also the level of P-O fit and the level of motivational premium.

Recalling that the outside options of non-motivated nursing assistants are given by $r_{il} = q_l$ and that a type-$ij$ individual gains $w + v_j$ when working as a nursing assistant, the motivated and non-motivated nursing assistants’ reservation wages, $w_{ih}^{P-O}$ and $w_{il}$, are written in Table 5 as solutions to equations $w + v = q_i + v''$ and $w = q_i$, respectively.
Table 5. Reservation Wages of Nursing Assistants

<table>
<thead>
<tr>
<th>Motivated Nursing Assistants</th>
<th>$w^P_{ih} = q_i - (v - v''')$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-motivated Nursing Assistants</td>
<td>$w_{il} = q_i$</td>
</tr>
</tbody>
</table>

Under inequality $\Delta q < v$, which describes the market for nursing assistants, the ranking of nursing assistants’ reservation wages is as follows:

$$\begin{align*}
    w^P_{lh} < w_{li} < w^P_{Hh} &< w_{Hi} < w^P_{Hh} \\
    w_{li} < w^P_{lh} &< w_{Hi} < w^P_{Hh}
\end{align*}$$

when $v - v''' > 0$, \( (a) \)

when $v - v'' < 0$, \( (b) \)

given that $|v'' - v| \to 0$, and therefore, $|v'' - v| < \Delta q ( < v)$.

I compare these two rankings with ranking (1-b), which describes the case of nursing assistants in Barigozzi and Turati (2012). The key difference is as follows. Since I suppose type-$ih$ potential nurses’ motivation is affected by P-O fit, an outside job option must exist which offers a similar level of P-O fit. The obvious effect is that the reservation wages of motivated nursing assistants are higher than in Barigozzi and Turati (2012), where the motivational premium exists only in nursing.

More precisely, if the inside motivational premium is larger than the outside one, i.e., if $v - v''' > 0$ as in ranking (2-a), the effect of motivation on the value of reservation wages is still (slightly) negative but lower than the positive effect of productivity; in symbols, $v - v'' \to 0 < \Delta q$. This is why the only difference between rankings (2-a) and (1-b) is that productive and motivated individuals’ reservation wage becomes larger than that of non-productive and non-motivated, $w^P_{Hh} > w_{li}$. By contrast, if the outside motivational premium is larger, i.e., $v - v'' < 0$, the effect of motivation on the value of reservation wages becomes positive, in that motivated nursing assistants have higher reservation wages than non-motivated for any given level of productivity: see ranking (2-b), where $w^P_{ih} > w_{il}$ for any given $i$. This is the opposite of what occurs in ranking (1-b), where $w_{ih} < w_{il}$ for any given $i$.

Overall, productive (i.e., type-$Hj$) nursing assistants enter the market at the two highest threshold wages in rankings (2-a) and (2-b). Unlike in Barigozzi and Turati (2012), a pay raise may turn out to be an appropriate policy to mitigate the shortage of nursing assistants because it increases both the long-run supply (as above, more applicants are
attracted when \( w \) rises) and the average productivity. Moreover, rankings (2-a) and (2-b) ensure that motivated and non-motivated types alternate in entering the nursing market as the wage rises. I conclude that the effect on the average motivation is not negative in that there is no scenario where both non-motivated types, \( L_l \) and \( H_l \), enter the market at the two highest wage threshold levels.

The above findings are summed up in the following

**Proposition 4** When P-O fit is considered the main determinant of motivation of nursing assistants, the long-run supply of nursing assistants and their average productivity are increasing in the wage. The average motivation fluctuates in the wage.

In conclusion, it is worth remarking that in case the inside and outside motivational premia are equal, \( v = v'' \) in symbols, the reservation wages of motivated nursing assistants become contingent only on productivity, \( w_{P-O}^{L_l} = q_i \), as the reservation wages of non-motivated nursing is. In that case, the overall ordering must be written as \( w_{L_l} = w_{P-O}^{L_l} < w_{H_l} = w_{P-O}^{H_l} \). Raising the wage above \( w_{H_l} = w_{P-O}^{H_l} \) attracts thus all productive nursing assistants and, as above, increases the average productivity of actual applicants. Interestingly, the average motivation rises as well provided that motivated nursing assistants are more numerous within the set of productive individuals than within the set of non-productive. Under this reasonable scenario of positive association between productivity and motivation, a pay raise has an *enhancing* impact on the average motivation as well.

**5 Conclusion**

Health economists are paying growing attention to the study of nursing labor markets where not only productivity but also motivation characterize potential applicants. The existing theoretical contributions pointed out an inefficiency wage mechanism, according to which a pay raise may yield a negative effect on the average productivity and/or the average motivation of applicants attracted. These predictions have been criticized by feminist economists, especially Valerie Adams, Julie A. Nelson, and Nancy Folbre, on the twofold basis that skills are assumed not to be important in nursing and that nurses’
motivation is modeled in an overly simplistic way.

Barigozzi and Turati (2012) addressed the first issue. Relying on their framework, the current paper aimed to address also the second criticism by analyzing determinants of work motivation. Two classical determinants, P-J fit and P-O fit, have been introduced on the basis of introductory notions from the organizational psychology and management literatures. This effort seemed to be valuable in that the inefficiency wage predictions concerning the average productivity and the average motivation of applicants attracted turned out not to be robust to the extension proposed. A pay raise was shown to have positive effect on the average productivity and no negative effect on the average motivation of applicants attracted. In conclusion, the current analysis showed that incorporating the two aforementioned remarks concerning nurses' skills and motivation into the Heyes' framework leads to a classical efficiency wage result. A pay raise in nursing, where wages are generally moderate, has has no negative effects on labor supply.

References


