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Data-based policymaking. Applications to energy and tourism policies

Ph.D Thesis

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Realizada bajo la tutorización de ANTONIOJ MORALES SILES y dirección de ANTONIO J MORALES SILES (si tuviera varios directores deberá hacer constar el nombre de todos)

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AUTORIZACIÓN PARA LECTURA DE LA TESIS DOCTORAL

El abajo firmante, Antonio J Morales Siles, Catedrático de Universidad, como director y tutor de la tesis doctoral elaborada por D. Ana Moniche Bermejo, titulada "Data-based policymaking. Applications to energy and tourism policies",

INFORMA QUE

La Tesis cumple todos los requisitos establecidos en la normativa de la Universidad de Málaga y del Programa de Doctorado en Economía y Empresa de dicha Universidad. Las publicaciones en coautoría que la avalan no han sido utilizadas en tesis anteriores.

AUTORIZA

La presentación formal y depósito de dicha tesis doctoral para el inicio del procedimiento de su defensa.

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Fdo. Antonio J Morales

Content

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Summary of the Thesis in Spanish

Capítulo 1: La ampliación (y explotación) de una base de datos comercial con fines de investigación

1.1 Introducción

En marzo de 2012, una organización de consumidores por suscripción, *Which?*[1], y una plataforma de peticiones y campañas, *38 Degrees*, lanzaron *The Big Switch* (TBS, en adelante), invitando a los consumidores a unirse a un plan de cambio colectivo para sus facturas de gas y electricidad. Un total de 280.000 personas se sumaron a la campaña y la organización *Which?* negoció con los proveedores de energía en nombre de los consumidores adheridos. En mayo de 2012, Co-operative Energy ganó la subasta y más de 36.000 hogares cambiaron de proveedor a través de esta campaña.

Este proceso generó una base de datos con información muy valiosa relativa a (i) la participación y (ii) el comportamiento de los consumidores en relación con el cambio de proveedor de energía. En el primer capítulo de la tesis se analiza el conjunto de datos generados, en primer lugar, en cuanto a la distribución geográfica de los hogares participantes[2] y en segundo lugar, en cuanto al comportamiento de los consumidores a medida que interactúan con el mercado en las distintas fases del proceso de búsqueda y cambio de proveedor de energía. Para el primer análisis usamos directamente los datos proporcionados por la base de datos comercial y en el segundo complementamos la base de datos comercial con encuestas posteriores. En este capítulo 1, explicamos cómo se amplía el conjunto de datos comerciales para ambas investigaciones.

1.2 Descripción de la base de datos comercial

La base de datos comercial se creó gracias a la interacción de los consumidores que manifestaron su interés por TBS, a los que se les pidió que facilitaran sus datos de contacto (dirección de correo electrónico) y su código postal. La organización envió a este primer grupo de personas un cuestionario muy detallado para recopilar información sobre su patrón de consumo energético que rellenaron alrededor de 165.000 consumidores. Con esta información, *Which?* organizó una "subasta inversa", con tres categorías (Adeudo directo en línea, Adeudo directo fuera de línea y Efectivo/cheque) en la que se invitó a las empresas energéticas a proponer su precio.

Which? proporcionó a los licitadores la información que ya tenían sobre el número total de personas que se habían inscrito, cuántas de ellas eran grandes consumidores, con qué proveedor estaban, etc. Cinco proveedores participaron en la subasta, que ganó *Co-*

[1] *Which?* Es el nombre comercial de la Asociación de Consumidores Británicos.
[2] Esta información se utiliza en el capítulo 2 de esta tesis para evaluar la eficacia de una campaña de cambio colectivo para movilizar a los consumidores.

operative Energy, un pequeño proveedor que había entrado en el mercado apenas un año antes. Debido a su pequeño tamaño, el número de clientes se limitó a 30.000. El segundo licitador de la subasta, EDF Energy, ofreció el contrato a los clientes restantes.

Posteriormente, la organización *Which?* envió un correo electrónico a todos los que se inscribieron en The Big Switch y les facilitó una estimación personalizada del ahorro que podían conseguir. A los consumidores que obtuvieron la mejor oferta del ganador de la subasta, CoOp, *Which?* sólo les mostró la oferta de CoOp. Sin embargo, no todos los consumidores obtuvieron la mejor oferta de CoOp; de hecho, sólo fue así para el 54% de ellos. Para aquellos casos en los que el mercado libre era mejor, *Which?* les mostraba dos opciones: la mejor oferta en la parte superior, con CoOp debajo. El 72% de los cambios se hicieron a través de la subasta, es decir, se cambiaron a CoOp. El proceso terminó con un número total de casi 38.000 consumidores que cambiaron de proveedor (switchers) que tuvieron que rellenar unos pocos datos más para finalizar el proceso.

Para todos aquellos consumidores que rellenaron el formulario completo, junto con los datos de contacto y el código postal, también disponemos de la siguiente información: Proveedor de energía, Tarifa energética, Gas de red (sí/no), Combustible dual[3] (sí/no), Contador de prepago (sí/no), Coste actual (estimado o directamente de la factura), Tipo de pago (DD fijo, DD variable, efectivo, prepago), Cuota de salida (sí/no/no lo sé), Consumo de energía, Coste y ahorro con CoOp, Coste y ahorro con otra oferta, Vio 1 o 2 ofertas, Cambio (sí/no) y A qué proveedor cambiaron.

1.3. La distribución geográfica de los participantes en The Big Switch

Nuestro siguiente paso es ajustar el análisis al nivel de código postal, es decir, para cada código postal del Reino Unido calculamos, a partir de la información contenida en la base de datos comercial, cuántos hogares expresaron interés en The Big Switch.

Una vez establecido el nivel geográfico como unidad de análisis, podemos abordar una cuestión interesante: la eficacia del cambio colectivo para llegar a los consumidores e involucrarse activamente en una iniciativa de cambio, con especial énfasis en los hogares vulnerables. Para ello, complementamos la base de datos comercial con información sobre variables relacionadas con la vulnerabilidad energética para dos ámbitos territoriales: el código postal y el "Output Area" (OA)[4].

[3] Gas y electricidad

[4] Los OA se introdujeron en el censo de 2001 a fin de proporcionar un área geográfica pequeña y estable para la producción de estadísticas de área local. En OA, la población no puede ser inferior a 100 personas o 40 hogares y no puede exceder las 625 personas o 250 hogares. Se construyen a partir de unidades de código postal.

El capítulo 2 utiliza esta base de datos para abordar la cuestión de si una campaña de cambio colectivo es una forma eficaz de movilizar a los hogares vulnerables hacia un comportamiento activo en el mercado de la energía.

1.4. El comportamiento de cambio de los participantes en The Big Switch

A continuación, nos centramos en los participantes en TBS que enviaron el cuestionario más amplio. Este conjunto de datos comerciales ofrece una valiosa oportunidad para analizar el comportamiento de los consumidores en su interacción con el mercado a la hora de investigar la decisión de cambiar de proveedor separadamente del resto del proceso de búsqueda que implica el cambio de proveedor.

Mientras que en otros contextos la búsqueda y el cambio suelen producirse simultáneamente, en TBS la búsqueda ya se realiza en nombre del consumidor, lo que aísla una decisión de cambio "pura", ya que se requiere muy poco esfuerzo adicional para aceptar la oferta.

Para investigar más a fondo a este grupo de consumidores y comprender mejor qué influye en su comportamiento a la hora de cambiar de compañía, en diciembre de 2012 lanzamos una encuesta piloto *online* dirigida a un subgrupo de 1.000 personas que participaban en la campaña TBS y que no cambiaron de compañía a pesar de que se les dijo que podrían ahorrar más de 63 libras al año si lo hacían.

A continuación, se seleccionó a un grupo de 70.000 consumidores para participar en una encuesta de seguimiento en la primavera de 2013. Sus resultados ofrecieron la posibilidad de combinar los datos recogidos durante el proceso de TBS y esta encuesta de seguimiento de 2013. El objetivo era obtener información sobre los factores que podrían influir en la probabilidad de que una persona cambie de proveedor de energía.

Es evidente que la muestra que analizamos no es representativa del conjunto de la población, ya que la selección está condicionada a que se responda voluntariamente a la encuesta o se compartan voluntariamente datos personales. No podemos disponer de los datos de quienes no participaron en la iniciativa, pero podemos aprovechar la ventaja de contar con un grupo selecto de consumidores que puede considerarse un grupo "límite superior" y examinar su comportamiento. La decisión fue seleccionar el subconjunto de participantes con más probabilidades de cambiar de proveedor en una situación en la que el cambio es relativamente fácil.

Para ello refinamos aún más la selección reteniendo a aquellos (a) para los que el resultado de la subasta ofrecía un ahorro monetario con respecto a su actual contrato de suministro; (b) que tenían un único proveedor de energía en el momento de la subasta; (c) que habían optado por participar en la subasta en línea de domiciliación

bancaria; (d) los encuestados que identificaron "ahorrar dinero" como una de sus motivaciones para participar en TBS.

Capítulo 2: ¿Consiguen las campañas colectivas de cambio de suministrador atraer a los hogares vulnerables? Datos de The Big Switch

2.1. Contexto

Una de las consecuencias de la crisis económica que comenzó en 2007 es que las cuestiones de la pobreza energética y los consumidores vulnerables ocuparon un lugar central en el debate político (véase Liddell, 2012 en el número especial de la revista *Energy Policy* sobre la pobreza energética de 2012).

Hasta Boardman, (1991), había poca conciencia de que una proporción considerable de la población sufría una forma distintiva de pobreza, es decir, la incapacidad de acceder a servicios energéticos adecuados en el hogar (Boardman, 1991). La pobreza energética, como llegó a conocerse, se estableció por primera vez en los ámbitos académico y político en el Reino Unido e Irlanda (Liddell, 2012) y luego se extendió gradualmente a la Unión Europea (Bouzarovski et al, 2012). En EE.UU., aunque la pobreza energética aún no ha sido reconocida como un problema en sí mismo por el gobierno federal (Bednar y Reames, 2020), sí que está siendo estudiado (Mohr, 2018). En los países en desarrollo, el término pobreza energética hace mayor hincapié en el aspecto de las infraestructuras que pueden dificultar el acceso inadecuado a la energía (Pachauri y Spreng, 2004), que hace que los hogares tengan que seguir utilizando fuentes de energía tradicionales (madera y carbón).

Se ha producido una expansión de estudios para definir indicadores que describan qué hogares son pobres energéticamente, en un intento de ayudar a los responsables políticos a abordar la pobreza energética. Moore (2012) y Romero et al (2018) contienen un buen debate sobre cómo los indicadores pueden ayudar a la política. En este trabajo, nos sumamos a esta literatura mediante el análisis de la eficacia de la primera iniciativa de cambio colectivo en el Reino Unido (TBS en 2012) para movilizar a los hogares vulnerables y conseguir tarifas energéticas más baratas.

En el contexto del mercado de la energía, herramientas como la compra colectiva o compra en bloque representan una oportunidad para que los consumidores incrementen su capacidad de negociación. El cambio colectivo de proveedor de energía se ha utilizado en Australia, Países Bajos, Reino Unido e Irlanda. En el Reino Unido, se hicieron muy populares en el mercado minorista británico de la energía tras el respaldo del Gobierno en 2012 y la financiación del Departamento de Energía y Cambio Climático en el marco del plan *Cheaper Energy Together*. Más recientemente, Ofgem -el regulador

gubernamental de los mercados del gas y la electricidad en Gran Bretaña- ha llevado a cabo una serie de cinco *Collective Switch Trials* en 2018 y 2019 (véase Ofgem, 2019b).

Desde el punto de vista de la demanda y de las políticas, la evaluación de la eficacia de estas herramientas es una cuestión clave si se quiere recomendar su uso como medio para hacer que los consumidores obtengan ofertas más ventajosa, ya que los altos precios de la energía son un factor importante en cualquier definición de pobreza energética. Esto es importante a la luz de los recientes acontecimientos, después de la pandemia COVID-19, la pérdida de ingresos y el aumento de los precios de la energía. Hay una ventaja adicional de las iniciativas colectivas de cambio de suministrador desde un punto de vista político, ya que permite a las pequeñas empresas energéticas entrar en el mercado y ampliar su base de clientes, aumentando así la competencia.

La evaluación de las iniciativas colectivas suele hacerse mediante encuestas de seguimiento a los participantes o recogiendo directamente información de los participantes que aceptan voluntariamente compartir la información solicitada con la institución organizadora. Por ejemplo, Deller et al (2021) complementaron la base de datos de The Big Switch con datos de dos encuestas de seguimiento para conocer los atributos sociodemográficos de los participantes. El Departamento de Energía y Cambio Climático del Reino Unido (2013) exigió a los planes a los que se concedieron fondos que recopilaran información sociodemográfica de los participantes para evaluar su eficacia.

Lo primero que hay que señalar es que los análisis basados en estos datos proporcionan una medida sesgada del éxito, ya que están condicionados a que los participantes respondan voluntariamente a la encuesta o compartan voluntariamente información personal. Estos datos proporcionan información condicionada a la participación; es decir, de los hogares participantes en el plan -y que finalmente se cambiaron de proveedor-, ¿cuántos eran vulnerables? Sin embargo, desde un punto de vista político, y con el fin de luchar contra la pobreza energética, parece que el dato relevante es exactamente el contrario: condicionado a experimentar pobreza energética, ¿cuántos se inscribieron en el plan colectivo?

2.2 Datos y Metodología

En el capítulo segundo de esta Tesis, aplicamos una metodología econométrica -modelos de conteo con inflado de ceros- para evaluar el éxito de TBS a la hora de movilizar a distintos tipos de hogares, sin necesidad de basarnos en ninguna encuesta o cuestionario ad hoc. En su lugar, hacemos uso de las elecciones reales de los hogares: es decir, analizando cómo se distribuyen en el Reino Unido los hogares que participan. Los modelos de conteo con inflado de ceros son herramientas econométricas estándar para analizar variables de recuento en diversos campos, como la epidemiología (Arab, 2015), la sanidad animal (Vergne et al, 2014), la ingeniería (Lambert, 1992), la agricultura

(Isgin et al, 2008), la salud pública (Rose et al, 2006) y las ciencias sociales (Böhning et al, 1997), entre otros.

Para aplicar esta metodología, necesitamos tres tipos de datos. En primer lugar, el número de hogares registrados por unidad geográfica (código postal y *Output Areas*) en el Reino Unido. En segundo lugar, los atributos socioeconómicos y demográficos de los hogares por unidad geográfica en el Reino Unido. En tercer lugar, los atributos de los hogares que tienen más probabilidades de sufrir pobreza energética. Los atributos de los hogares proceden de fuentes estadísticas oficiales y se han seleccionado basándonos en la amplia bibliografía sobre indicadores de pobreza energética y hogares vulnerables.

Una ventaja adicional de la metodología propuesta es que estima dos procesos diferentes: el proceso de exceso cero (el proceso de concienciación) y el proceso de conteo real (el proceso de implicación). Por lo tanto, podemos evaluar la eficacia de la iniciativa de cambio energético colectivo en cuanto a la penetración en los hogares -primer proceso- y en cuanto a la implicación de los hogares -segundo proceso- y su relación con los atributos de los mismos, lo que revela qué atributos facilitan o inhiben el éxito de la iniciativa de cambio colectivo en el Reino Unido.

Nuestro análisis enseña que The Big Switch sensibilizó a casi todos los consumidores vulnerables (según la definición de Ofgem), aunque hubo dos tipos concretos de hogares vulnerables que fueron especialmente inactivos: los que tenían niños y los muy desfavorecidos.

2.3 Implicaciones políticas y conclusiones

Los esfuerzos para reducir la pobreza energética están en el centro de la acción política en muchos países (Reino Unido, Irlanda, UE y Nueva Zelanda entre otros) desde la recesión económica de 2007. Hay muchas definiciones de la pobreza energética - y diferentes países pueden centrarse en diferentes definiciones, pero independientemente de la definición particular, se acepta de forma general que una reducción de los precios de la energía ayudará a aliviar la pobreza energética, pero esta medida requiere del compromiso de los consumidores; de lo contrario, las empresas no sentirán la presión competitiva. El compromiso de los consumidores requiere de ellos dos acciones concretas: en primer lugar, la concienciación (saber que existen tarifas más baratas en el mercado); y en segundo lugar, el cambio de proveedor tras adquirir la información.

El suministro obligatorio de información por parte de los proveedores de energía y la promoción de sitios web de comparación de precios son medidas políticas populares destinadas a reducir los costes de búsqueda y aumentar la concienciación (véase, por

ejemplo, Dobbins et al, 2015), pero existen otras barreras que impiden que los consumidores las utilicen: barreras conductuales (y cognitivas). Hay pruebas de que estas barreras afectan claramente a los consumidores vulnerables (véase, por ejemplo, Allcott y Mullainathan, 2010 y Atasoy y Madlener, 2020), lo que reduce la eficacia de estas medidas para abordar la pobreza energética en los consumidores vulnerables.

¿Qué nos queda desde el punto de vista político? La literatura destaca el papel de asociaciones de la sociedad civil y otras organizaciones no gubernamentales en la asistencia a la población en situación de pobreza energética a través de intervenciones (véase, por ejemplo, Lorenç et al, 2013). Pero este tipo de acciones es muy exigente, ya que requiere un conocimiento profundo de qué hogares vulnerables están en situación de pobreza energética y se limita necesariamente a un pequeño número de hogares, ya que las intervenciones requieren visitas repetidas a los hogares por parte de personal especializado.

Nuestro trabajo ha identificado una medida política que puede ayudar: la promoción de iniciativas de cambio colectivo. Comprobamos que The Big Switch sensibilizó a todos los consumidores vulnerables (según la definición de Ofgem). La gran campaña de promoción es lo que explica por qué algunas dimensiones de vulnerabilidad que anteriormente se habían asociado a una menor concienciación (mayores de 65 años y zonas rurales) en la bibliografía, tienen un impacto positivo en el caso de The Big Switch.

Por supuesto, muchos de los resultados que hemos identificado en este documento dependen de las características específicas de The Big Switch. Una de ellas podría ser, por ejemplo, que la iniciativa fuera organizada por una asociación de consumidores (Which?) y una plataforma de peticiones y campañas (38 degrees) y que todos sus miembros recibieron información sobre ella a través de canales privados (correos electrónicos y revistas). Desde el punto de vista del éxito de la iniciativa, esto es una buena noticia, porque aumentará la concienciación y esto lo confirman nuestros datos.

Incluso cuando la concienciación se haya realizado, el registro requiere la adopción de medidas por parte de los consumidores, y en este paso, fue complicado para TBS, al igual que para cualquier otra medida política, al intentar movilizar a los consumidores vulnerables. Hemos comprobado que dos tipos concretos de hogares vulnerables fueron especialmente inactivos: los que tenían niños y los muy desfavorecidos. Por lo tanto, este resultado muestra un efecto acumulativo de la vulnerabilidad e identifica a los hogares con niños como extremadamente vulnerables. Y es aquí donde se podrían centrar los esfuerzos desde el punto de vista político, si se quiere poner el foco en la vulnerabilidad en el cambio colectivo.

Capítulo 3. Beneficios de la integración de los agentes políticos en el diseño de indicadores de turismo sostenible diseño de indicadores de turismo sostenible: el caso de Andalucía

3.1. Contexto

El turismo se ha convertido en una de las industrias de más rápido crecimiento en los últimos años y fue declarado uno de los sectores económicos más importantes del mundo en 2019 (OCDE, 2020). Las investigaciones señalan que el aumento constante de las actividades turísticas genera retos en cuanto a la compatibilidad de este desarrollo acelerado con modelos empresariales sostenibles (Butler, 1999).

El fuerte impacto que la pandemia COVID-19 generó en las actividades turísticas tuvo graves implicaciones para los destinos turísticos con previsibles impactos económicos, sociales y medioambientales (Gallego & Font, 2020). En este contexto, el desarrollo de estrategias y políticas turísticas basadas en principios de sostenibilidad se ha convertido en una cuestión política aún más importante en el turismo (OMT, 2020).

Las actividades turísticas tienen importantes efectos en las economías, el medio ambiente y las sociedades. Para garantizar una gestión eficaz del turismo, los gobiernos necesitan herramientas para medir estos impactos, por lo que los gestores de los destinos turísticos deben crear estructuras organizativas que exploten los datos disponibles y produzcan, gestionen e integren la información de la forma más eficaz (Gretzel et al., 2015; OMT, 2020).

La implantación del turismo sostenible requiere una gobernanza adaptada y eficaz (Bramwell y Lane, 2011) para garantizar la aplicación satisfactoria de los procesos de seguimiento y que las partes interesadas acepten los resultados (Hall, 2009). El objetivo de la presente investigación es integrar la perspectiva de la gobernanza territorial en la medición de la sostenibilidad del turismo y examinar las formas en que los agentes políticos influyen en el diseño y la aplicación de un sistema de indicadores para la gestión sostenible del turismo. La metodología utilizada es un estudio de caso sobre el desarrollo de un sistema de medición de la sostenibilidad turística implantado en Andalucía (España) que nos ha permitido responder a las siguientes preguntas de investigación:

- ¿Cuáles son los retos a los que se enfrenta la integración de los actores políticos en el proceso de creación de un sistema de indicadores como herramienta para medir los impactos de las actividades turísticas en el desarrollo sostenible?
- ¿Cuáles son los beneficios obtenidos de esta integración?
- ¿Cuáles son las carencias de esta integración?

La investigación que se realiza en este capítulo es un estudio de caso centrado en una herramienta de seguimiento de las políticas de los gobiernos regionales: el Sistema de Indicadores de Desarrollo Turístico Sostenible de Andalucía (SISTA). El sistema fue desarrollado por un grupo interdisciplinar de 15 expertos del gobierno regional y del mundo académico.

Aplicamos la teoría institucional en el sector público del turismo para estudiar un proceso de desinstitucionalización con el fin de obtener información sobre cómo los actores dentro de las organizaciones de gestión del turismo pueden dar forma a las instituciones.

3.2 Debate y conclusiones

Esta investigación sostiene que, si bien los actores dentro de las organizaciones de gestión del turismo tienen el poder de moldear las instituciones, las estructuras y los patrones de comportamiento permanecen para mantener la legitimidad (DiMaggio & Powell, 1983). Los actores que intentan ejercer el cambio a menudo experimentan influencias contradictorias con las prácticas establecidas, el prestar una mayor atención a los indicadores de turismo sostenible puede vencer la resistencia, permitiendo medir la sostenibilidad del turismo con vistas a mejorar los resultados.

Centrándonos en la primera pregunta de investigación, cualquier integración en el mundo real de la sostenibilidad a largo plazo requiere un cambio transformador en los gobiernos (David & Bitektine, 2009), lo que plantea retos relacionados con la temporalidad y la incertidumbre. La temporalidad está relacionada con los breves períodos que abarcan las escalas de medición utilizadas para orientar los ciclos políticos y normativos, mientras que la incertidumbre surge de la dificultad de juzgar la eficacia de las medidas políticas (Hall, 2011).

Las transformaciones de sectores dinámicos como el turismo se han guiado tradicionalmente por objetivos electorales a corto plazo, por lo que carecen de una visión más estratégica a largo plazo (Go et al., 1992; Vogev & Swanson, 1988). Los indicadores deben mantenerse, probarse y ajustarse a lo largo del tiempo, permitiendo que las organizaciones turísticas evolucionen y se adapten en consecuencia, dando lugar a un cambio permanente y a beneficios perceptibles para los responsables políticos (Hezri, 2004; Francheschini, 2007). El SISTA se concibió como una herramienta a largo plazo, sin embargo, su aplicación práctica durante los años siguientes ha seguido siendo parcial, ya sea centrándose en un tema clave aislado (es decir, el empleo turístico) o en un catálogo de indicadores relevantes para cumplir objetivos de planificación específicos, como en el plan del gobierno regional para reducir la estacionalidad de 2016 a 2018 (Junta de Andalucía, 2016c) o el Plan de Marketing Turístico de la Junta, Horizonte 2020 (Junta de Andalucía, 2016a).

Los retos de incertidumbre suelen implicar que los actores políticos sean reacios a exponer indicadores potencialmente negativos, evitando que los creadores de opinión pública y los potenciales votantes vean los malos resultados como responsabilidad directa de los actuales responsables.

El SISTA se creó a lo largo de varios años de aplicaciones parciales y el gran número de indicadores resultantes amenazó aún más su supervivencia. Es preciso actualizar periódicamente la información procedente de diversas fuentes e incorporar las mejoras que exige la evolución del sistema, lo que requiere un funcionario a tiempo completo y otro a tiempo parcial. Los recursos de personal del Gobierno no pueden satisfacer plenamente esta necesidad, y actualmente los funcionarios tienen que compaginar sus tareas habituales con el mantenimiento del SISTA. Aunque esto permite a los funcionarios atender solicitudes específicas en un plazo razonable, siguen sin poder mantener todos los componentes del SISTA para garantizar una medición completa y continua.

Un sistema de indicadores de desarrollo turístico sostenible no debería verse en peligro por las fluctuaciones presupuestarias, los cambios en el entorno macroeconómico o los virajes políticos. En muchas organizaciones, el compromiso de la dirección con el desarrollo y la aplicación de medidas de rendimiento es un elemento fundamental para el éxito del sistema de indicadores (Franceschini et al., 2007). SISTA ha evolucionado en cuanto a objetivos y estructura, pero el proyecto no ha sido inmune a los cambios del entorno político. No obstante, los agentes políticos se han beneficiado de los conocimientos de sus organizaciones adquiridos a lo largo de los años.

A pesar de estos retos que han afectado a largo plazo, la aplicación práctica del SISTA y su proceso de desarrollo generaron resultados positivos (segunda pregunta de investigación). En primer lugar, la concienciación entre los agentes políticos sobre los usos estratégicos de los datos para respaldar las decisiones políticas, en contraposición al simple apoyo a los discursos políticos.

Asimismo, cualquier proceso de aprendizaje político que se centre principalmente en la definición de instrumentos y/o indicadores políticos podría considerarse meramente como un cambio de primer orden. No obstante, otro beneficio generado por este proceso es la introducción de nuevos indicadores relacionados con las políticas, por lo que, este proceso tiene el potencial de convertirse en un cambio de segundo orden si los nuevos paradigmas políticos están en funcionamiento (Hall, 2011). Por ejemplo, la definición de sostenibilidad en el Plan General de Turismo Sostenible de Andalucía, Horizonte 2020 (Junta de Andalucía, 2016b) añade nuevas dimensiones al concepto tradicional que sólo incluía lo económico, lo ambiental y lo social.

La experiencia SISTA fue un proceso de mejora continua, integrando avances en definiciones, metodologías o herramientas estadísticas y/o de documentación. Aunque

el objetivo final de este proceso de desarrollo era crear un sistema para medir la sostenibilidad en el turismo, el proceso en sí mismo proporcionó muchos otros beneficios secundarios de gran interés. Experiencias similares con dicho valor añadido se han reportado en otros lugares, incluso en otros países que implementan marcos para los objetivos de desarrollo sostenible (Eurostat, 2018). Estos beneficios secundarios bien podrían resultar más importantes que los resultados finales en términos de rendimiento (Miola & Schiltz, 2019).

El proceso SISTA generó beneficios intangibles (Gahin et al., 2003), como la creación de redes entre las partes interesadas del mundo académico y los responsables políticos, ofreciendo oportunidades de aprendizaje mutuo (Becker, 2005). Se produjeron intercambios de conocimientos en materia de medición de la sostenibilidad, estadísticas, fuentes de información y gobernanza, entre otros ámbitos. Por otra parte, en la dimensión empírica, el sistema de indicadores desarrollado con fines políticos facilita la identificación de los aspectos considerados más importantes.

La integración de los actores políticos en el proceso de creación de un sistema de indicadores no ha servido para identificar un conjunto de indicadores básicos que puedan aplicarse a cualquier destino (tercera pregunta de investigación). Aunque los investigadores están de acuerdo en las dimensiones básicas de la sostenibilidad, no se ha alcanzado un consenso claro sobre un marco para medir el turismo sostenible (Asmelash & Kumar, 2019; Cernat & Gourdon, 2012; Torres-Delgado & Saarinen, 2014), por lo que no existe una lista de indicadores estándar. Esta laguna en la bibliografía afecta directamente a la capacidad de los destinos turísticos para aplicar la evaluación comparativa. Un enfoque específico para cada destino debería ser compatible con la determinación de un conjunto de indicadores básicos que integren aspectos básicos de la sostenibilidad a un nivel más holístico o global (Roberts & Tribe, 2008).

Sin embargo, estos resultados estadísticos por sí solos no pueden proporcionar toda la información necesaria; el GT SISTA descubrió que algunos objetivos significativos del turismo sostenible aún no se han integrado en las prioridades de los productores de estadísticas oficiales. Una mayor cooperación con estos productores podría ayudar a que las cuestiones relegadas y que ocupan un lugar prioritario en las agendas políticas del turismo (por ejemplo, la sostenibilidad, la accesibilidad y la calidad del empleo), se prioricen también en las estadísticas oficiales.

Los sistemas de indicadores deben encontrar un equilibrio entre la especificidad dependiente del contexto y la relevancia global (Torres-Delgado y Saarinen, 2014). El uso de indicadores básicos estándar podría hacer más viable la evaluación comparativa entre destinos turísticos y facilitar el establecimiento de objetivos factibles basados en los valores obtenidos por destinos similares. Este enfoque más amplio podría generar

nuevas oportunidades para realizar análisis que a menudo no están disponibles con los sistemas de indicadores actuales.

Además, los investigadores reconocen que las estadísticas oficiales sistemáticas permiten realizar comparaciones entre destinos, de ahí la importancia de una mayor disponibilidad de datos sobre variables básicas, necesarios para construir indicadores homogéneos y sistemas comparables. Ya se han hecho avances, como el trabajo realizado por Eurostat, para que la información esté disponible a nivel regional (es decir, en la Nomenclatura de Unidades Territoriales Estadísticas-2). Sin embargo, los resultados indican que es necesario seguir trabajando, algo especialmente evidente a nivel local, ya que solo entre el 30 % y el 40 % de los requisitos del ETIS (Comisión Europea, 2016) pueden cumplirse con las estadísticas oficiales existentes (Font, 2019).

Por último, esta investigación respalda el cambio del enfoque tradicional de la teoría institucional, que se centra en la recopilación de datos procedentes del exterior de las organizaciones en cuestión, hacia un proceso de interpretación interna (Suddaby, 2010). En concreto, los agentes de las organizaciones públicas de turismo pueden desempeñar un papel importante en la introducción del paradigma de la política de sostenibilidad analizado en esta investigación, mediante el diseño, el mantenimiento y el ajuste de nuevos indicadores relacionados a lo largo del tiempo.

En resumen, nuestros resultados demuestran que la participación de los agentes políticos aumenta la utilidad de estos sistemas, introduciendo el paradigma de la política de sostenibilidad y concienciando sobre los usos estratégicos de los datos para apoyar las decisiones políticas. Por otro lado, los retos de la participación de los agentes políticos están relacionados con el desajuste entre la evolución de la sostenibilidad y los ciclos políticos, y con la dificultad de juzgar la eficacia de las medidas políticas. Esta investigación servirá de referencia para otros destinos turísticos que trabajen en el desarrollo de sistemas de medición con aplicaciones prácticas, así como para que el mundo académico integre las necesidades de los agentes políticos en los planteamientos teóricos.

Introduction

This thesis explores how policy makers can take advantage of data to improve the policy design process. It does so by considering two separate case studies applied to two topics, energy consumption and tourism, which entail relevant policy questions and which have important implications for sustainability.

Each case study delves into a distinct phase of the policy design process. The first study (covered in Chapters 1 and 2) delves into consumer behaviour within the energy sector and performs an ex-post evaluation of a significant collective switching initiative implemented in the UK in 2012. This initiative aimed to encourage consumers to switch to more affordable energy tariffs. As an ex-post analysis, policy makers play a passive role as they serve as final recipients of the policy evaluation exercise. However, they can utilize this knowledge to promote similar initiatives based on the success of the original one or incorporate changes to improve the policy design. The second study, covered in Chapter 3, grants an active role to policy makers in the development of easily understandable knowledge products for their use. This chapter effectively captures the communication dilemmas surrounding the choice between a dashboard or a composite index, or even both, as means of conveying information.

Collective switching mechanisms are a tool that has garnered extensive utilization not only in the United Kingdom but also in other nations, aiming to encourage consumers to switch their energy providers, thereby intensifying competitive pressure in the energy market. The ultimate goal is to leverage this increased competition as a mechanism to drive down prices.

From the demand side and from a policy point of view, the evaluation of the effectiveness of these mechanisms is a key issue if one is to recommend their use as a means to make consumers get cheaper energy deals, as high energy prices are one important factor in any definition of fuel poverty. The importance of fuel prices and poverty are increasingly important in the light of recent events, with the outbreak of COVID-19, the Ukrainian conflict and the recent global inflation.

The ex-post policy evaluation presents some big challenges. The first one is the compilation of the database, which comes from a collective switching initiative that took place in May 2012 in the United Kingdom and that was promoted by *Which?*, the largest consumer organization in the United Kingdom with more than 600,000 subscribers. Hence, by nature it is a commercial database that was not designed to serve any purpose other than administrative requirements.

To perform the ex-post evaluation, the commercial database needs to be complemented and integrated with additional information. Chapter 1 offers a methodological account of the process of generating and designing the dataset

necessary to carry out an evaluation analysis. It focuses on how to conduct a survey to participants to *unveil the reasons for taking / or not taking cheaper deals*.

In the second chapter of the thesis, we build on the enlarged database to analyse whether The Big Switch was successful at *fighting fuel poverty*. It is important to notice that we do not use the survey responses to participants. The reason is that (i) they provide a biased measure of success –as they are conditional on voluntarily answering the survey or voluntarily sharing personal information and (ii) they provide information conditional on participation; that is, from the participating households in the scheme – and eventually switching-, how many were vulnerable? However, from a policy point of view, and to fight fuel poverty, it seems that the relevant piece of information is the exact opposite: conditional on experiencing fuel poverty, how many registered for the collective scheme? To address this research question, we propose a novel zero-inflated count data methodology to distinguish the awareness process from the engagement process.

Finally, the third chapter of this thesis delves into the critical task of measuring the impact of tourism activities on sustainable development. The use of systems of indicators is prevalent in tourism sustainability management, necessitating a delicate balance between academic and professional perspectives. Governments, as crucial players in the tourism sector, can harness indicators as powerful tools to drive the sustainability of tourism. Numerous initiatives, official agendas, and proposals have emerged, aiming to define sustainable tourism and provide assessment tools for its evaluation.

Within this context, the chapter presents a compelling case study that centers on the Andalusia System of Sustainable Tourism Development Indicators (SISTA), which serves as a monitoring tool for regional government policies. This system was collaboratively developed by an interdisciplinary group of 15 experts representing both the regional government and academia. Drawing upon institutional theory in the context of the tourism public sector, the study explores a process of deinstitutionalization, shedding light on how actors within tourism management organizations can shape and influence institutional frameworks.

Together, the three chapters of this thesis aim to provide valuable insights for policy makers by addressing the following key questions:

i. To what extent should policy interventions consider the concept of bounded rationality among consumers?
ii. ii. Is conducting surveys among participants the most effective approach to evaluate the effectiveness of collective switching initiatives in combating fuel poverty? Are there alternative and superior methods available for assessing their impact?

iii. How does the involvement of policy actors contribute to the development of easily comprehensible knowledge products for practical implementation?

By employing quantitative methods, this research provides comprehensive answers to these inquiries, emphasizing the significance of utilizing data-driven approaches to inform and shape policy design.

Chapter 1: The enlargement (and exploitation) of a commercial database for research purposes[5]

1.1 Introduction

In March 2012, a subscription-based consumer organisation, *Which?*,[6] and a campaigning group, *38 Degrees*, launched *The Big Switch* (TBS, here after), inviting consumers to join a collective switching scheme for their gas and electricity bills. A total of 280,000 people joined the campaign and *Which?* negotiated with energy suppliers on behalf of them. In May 2012 Co-operative Energy won The Big Switch auction. Over 36,000 households switched suppliers through The Big Switch campaign.

This collective switching campaign generated a database with very valuable information concerning (i) participation and (ii) switching behaviour. In this chapter, we describe the commercial dataset along two lines: first, we analyse the geographical distribution of participating households. This information is used in Chapter 2 of this Thesis to evaluate the effectiveness of a collective switching campaign to mobilize consumers. Second, we describe participants' behaviour as they interact with the market at different stages of the search and switching process.

For the first research question, we can directly use the data provided by the commercial database. For the second research question, we complement the commercial database with subsequent surveys directed to participating consumers, bringing together information on their attitudes, history of engagement and behaviour in the market. In this chapter, we explain how the commercial dataset is enlarged in order to provide informed evidence to identify what enables and encourages switching and what may deter it.

1.2 Description of the commercial database

The commercial database was created through the online interaction of more than 280,000 consumers expressing interest in TBS. They were asked to provide their contact details (email address) and their postcode. Many of these consumers were *Which?* and *38 degrees* members.

The organisation sent to this first group of people a very detailed questionnaire to compile information about their energy consumption pattern. 165,000 consumers (more than 52% of initial number of participants) showed further interest and filled a longer form.

[5] This chapter describes the process of creation of the final dataset used in Deller, Giulietti, Loomes, Price, Moniche and Jeon (2021) as well as some preliminary results that guided their analysis.
[6] *Which?* is the trading name of the British Consumers' Association.

Once they had all the information of the people interested in TBS, *Which?* held a "reverse auction" where energy companies were invited to put forward their price per kilowatt of electricity and cubic metre of gas. The auction took place on 9th of May, with three categories: Direct Debit Online, Direct Debit Offline and Cash/Cheque.

Which? provided the bidders with the information they already had about the total number of people signing in, how many of them were big consumers, with which supplier they were, etc.

Five suppliers took part in the auction, and the Co-operative Energy won it. It was a small supplier that had entered the energy market just one year before. Due to its small size the number of customers was capped at 30,000. Subsequent Switchers were offered the deal by second bidder in the auction, EDF Energy. *Which?* emailed all those who completed their registration for The Big Switch and gave them a personalised savings estimate letting them know how much they could save. For those consumers that got the best deal from the auction winner CoOp, *Which?* only showed them the CoOp offer. However, not every consumer had CoOp as the best deal, in fact it was just for 54% of them. For those cases where the open market was better, Which? showed them two options: the best offer at the top, with coOp underneath. 72% of the switchings went via the auction, i.e. they switched to the CoOp.

At the end of the process, the organisation of the collective switching campaign ended up with a total number of almost 38,000 Switchers that then had to fill in more details to switch suppliers.

Using the commercial database, we can classify participants in The Big Switch in four different groups:

- Group 1. Those who just expressed interest (but did not complete the longer form).
- Group 2. People that completed the form but did not obtain a better deal. This group is composed of well-informed consumers and active in terms of searching/switching.
- Group 3. People that obtained a better deal but did not switch. This is a target group of consumers for researching switching behaviour, where we want to distinguish those who got only a slightly better deal from those who could make more money. This is also the place to distinguish between those with exit fees (or without or that do not know) since this will affect the amount they would actually gain.
- Group 4. People that obtained a better deal and did switch. This is also our target group of consumers for investigating the reasons for switching supplier and a very relevant comparison group with group 3.

For those consumers from group 1, we have information on contact details and 6-digit postcode. For the rest of the participants, we also have the following information:

- Energy supplier
- Energy Tariff
- Mains gas (yes/no)
- Dual fuel (yes/no)
- Prepay metre (yes/no)
- Current cost (estimated or directly from the bill)
- Payment type (fixed DD, Vble DD, Cash, prepayment)
- Exit fee (yes/no/ Don´t know)
- Energy usage
- Cost and savings with CoOp
- Cost and savings with other deal
- Saw 1 or 2 offers
- Switch (yes/no)
- To which Supplier they switched

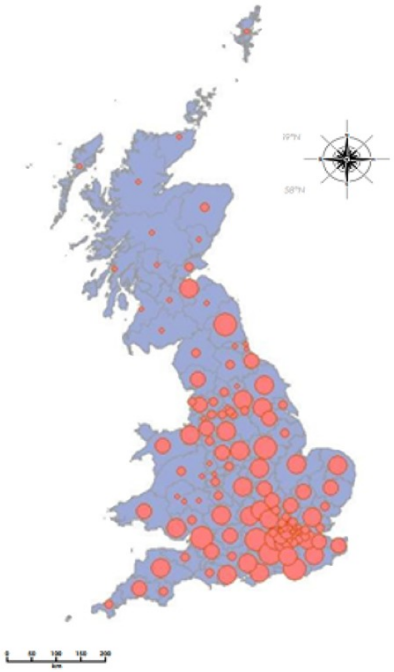
The commercial database is potentially "biased" because it is exclusively composed of those consumers who expressed an interest in the collective switching. The first thing we must analyse is whether the expression of interest is "randomly distributed" along the British population. This is done in the next section.

1.3. The geographical distribution of participants in The Big Switch

The geographical characteristics of the sample of the commercial database can be analysed using the variable "postcode".[7] This information allows the location of participants on a map of Great Britain (Figure 1.1). We observe that most respondents are placed in the most populated areas of Great Britain, although they are not evenly distributed as some areas are overrepresented while others are underrepresented.

[7] 87% of observations in the commercial database have a valid postcode, the rest being empty (4,148) or not valid (10%).

Figure 1.1. Geographical distribution of participants in The Big Switch



More specifically, and in broader terms (Government's Office Regions level) northern regions are underrepresented as shown in Table 1.1.

Table 1.1. Distribution of respondents at UK Government's Office Regions level

GOR's	Population	% Population	Responses	% Responses	%resp /% pop
Scotland	5,295,088	9%	7,639	6%	0.71
Wales	3,063,456	5%	5,268	4%	0.85
North East	2,596,886	4%	4,213	3%	0.80
North West	7,052,177	11%	12,320	10%	0.86
Yorkshire and The Humber	5,283,733	9%	10,165	8%	0.95
East Midlands	4,533,222	7%	9,258	7%	1.01
West Midlands	5,601,847	9%	8,997	7%	0.79
East of England	5,846,965	10%	13,172	11%	1.11
London	8,173,941	13%	14,624	12%	0.88
South East	8,634,750	14%	23,912	19%	1.37
South West	5,288,935	9%	14,655	12%	1.37
TOTAL	61,371,000		124,223		

Source: own data and Office for National Statistics Estimates of the population for England, Wales, Scotland (2012)

Our next step is to set the analysis to the postcode level, i.e. for each postcode in UK we compute from the information contained in the commercial database, how many households expressed interest in The Big Switch. Notice that the modified database set at the postcode level is completely anonymised, as we only need to keep track of the number of household that participated at the TBS. We find that there are 124,803

postcodes with at least one registered household for TBS, while the remaining 1,002,880 postcodes have no single household expressing any interest in the campaign.

Once we set the geographical level as the unit of analysis, we can address an interesting issue: the effectiveness of collective switching to reach consumers and engage them in an active switching behaviour, with a special emphasis on vulnerable households. We do so by complementing the commercial database with information on variables that the literature suggests are related to energy vulnerability.[8]

At the postcode level, we available information from official statistics sources was:

- The number of households (from the Office for National Statistics, ONS, the UK's largest independent producer of official statistics and the recognised national statistical institute of the UK).
- Data from the UK´s communication regulator OFCOM on internet access, based on a snapshot of data provided by the largest fixed broadband providers in the UK for the period of June to July 2012.
- Identification of rurality (from ONS).
- CACI estimations of the household average income for year 2012 based on the median income of inhabitants of the six digit postcodes.

From the above variables we focus on the distribution of income for participating and non-participating postcodes in the TBS,[9] (the analysis is included in Appendix 1.1). The relevant findings are:

- Those postcodes with participating households in TBS have a higher income than those postcodes with no participating households.
- Those postcodes with participating households that gave all the details have a higher income than the rest of postcodes in the UK.
- The postcodes where there are consumers that joined TBS and gave all the details do not have a different income than the postcodes of those that just expressed interest in the initiative.

To add broader socioeconomic and relevant information we used Census statistics, so we had to restrict attention to households from England and Wales because the Office for National Statistics (ONS) is only responsible for these two areas. Also, this

[8] Perfect data for assessing the effectiveness of this collective switching tool with respect to reaching vulnerable consumers would be to analyse individual data for each household with information about their socioeconomic characteristics. This information should be available both for those households that participated in TBS and for those that did not. This individual information does not exist, but we have tried to approach this policy issue by using the maximum territorial disaggregation of the available socioeconomic and other relevant information.

[9] We also analysed the postcodes where the consumers to which we sent the subsequent follow up questionnaires are and the postcodes where the consumers that answered the follow up survey are.

information is available just for Output Areas (OA)[10], that are the building blocks of Census geography, and they are built from postcode units.

At the OA level, we enlarge the database with the following information:

- The percentage of households with someone aged 65 or over, the percentage of households with someone disabled, the percentage of households highly deprived and some other dimensions that might be indicative of vulnerability such as lone parents, unemployment, non-UK residents (for capturing immigration) and shared accommodation.
- Information on variables associated with the energy consumption profile that might affect how active households are on the energy market. We include home ownership and whether there are children in the household. We also account for the size of the household (percentage of households with three or more rooms) and for the way in which homes are heated (percentage of households with electric heating).
- Census 2011 information of whether an output area is rural or urban. The ONS criteria to treat an Output Area as "urban" is that the majority of the population lives within settlements with a population of 10,000 or more. Once the internet penetration is computed for each postcode, we aggregate the information for each output area.

Chapter 2 uses this enlarged database to address the issue of whether a collective switching campaign is a successful way of mobilizing vulnerable households into an active behaviour in the energy market.

1.4. The switching behaviour of participants in The Big Switch

We next focus on participants in TBS that filled the larger questionnaire. For these households, the commercial database offers the opportunity to observe switching decisions made by real consumers when confronted with an offer or offers. The data include information about the energy characteristics of households (previous supplier, actual or estimated annual consumption, payment method, whether one or two fuels are consumed), the offer(s) which participants face, and whether they accepted an offer (and which one if there were two).

By filling the questionnaires, receiving the information, and reacting to it, the consumers are creating a very rich piece of information (see Table 1.2). This commercial dataset provides a valuable opportunity to analyse the behaviour of consumers as they interact

[10] OAs were introduced for the 2001 Census to provide a stable small area geography for the production of local area statistics. In OA, the population cannot fall below 100 people or 40 households and cannot exceed 625 people or 250 households.

with the market to investigate the switching decision separately from the rest of the search process involved in changing supplier.

While searching and switching often happen simultaneously in other contexts, in TBS searching is already carried out on behalf of the consumer, isolating a 'pure' switching decision, since very little extra effort is required to accept the offer.

Table 1.2. Summary statistics on switching behaviour from TBS commercial database

Statistics	Participants in TBS with complete data
% Switching supplier at TBS	24.4
% Offered a saving by TBS	87.3
Median bill size (actual and estimated) (£)	1,176
% Using an estimate of their bill	35.6
% Facing an exit fee	13.8
Median saving offered by best supplier	106.00
Median saving as % of existing bill[11]	10.6
% shown two offers	45.7
% Paying for their electricity by direct debit	91.2
Total number of observations	138,951[12]

To further investigate this cluster of consumers and to understand better what affects consumer switching behaviour, we launched a pilot online survey in December 2012 targeted to a subgroup of 1,000 people participating in TBS campaign and that did not switch even though they were told they could save more than £63 per year by doing so.

After this, a group of 70,000 consumers was targeted for taking part in a follow-up survey in spring 2013. A total of 18,401 people provided complete responses offering the possibility of combining the data collected during the TBS process and this 2013 follow-up survey. The focus of this 2013 follow-up survey was to elicit information on factors which might affect the probability of an individual switching energy supplier.

1.5 Insights from the commercial database that guided subsequent surveys

The first step was a preliminary descriptive analysis of the commercial database that allowed the identification of variables that can potentially affect the switching decision: monetary savings and uncertainty or preparedness.

[11] These savings figures are based only on those individuals offered a positive saving as part of TBS.

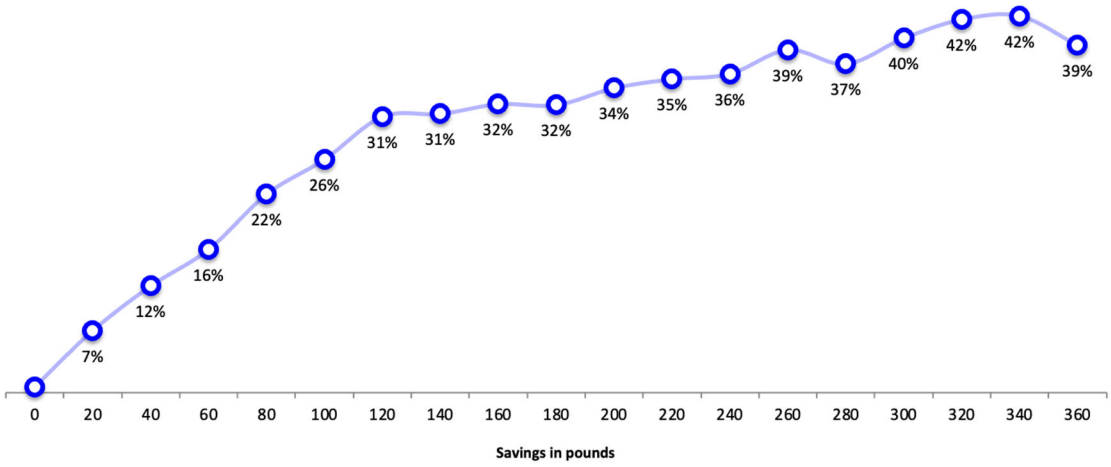
[12] After data cleaning, excluding extreme and nonsensical values.

- **Monetary savings:**

It is striking the difference in the percentage of people who were offered savings as part of the Big Switch process, around 87%, and the far smaller percentage of people who actually chose to switch supplier, less than 25%.

However, we found out that the number of Switchers increases as the saving amount increases (Figure 1.2) but that there is a high number of consumers (around 12,000) that decided not to switch, even if they could get annual savings over 200 pounds.

Figure 1.2. Switching rate per amount of savings



The same applies for the percentage of savings, as a higher proportion of switchers increases as the percentage of savings over current cost increases (Table 1.3), but still a similar proportion (63%) does not switch when savings are more than 15% of their annual energy cost (around 15,000 consumers).

- **Uncertainty or preparedness:**

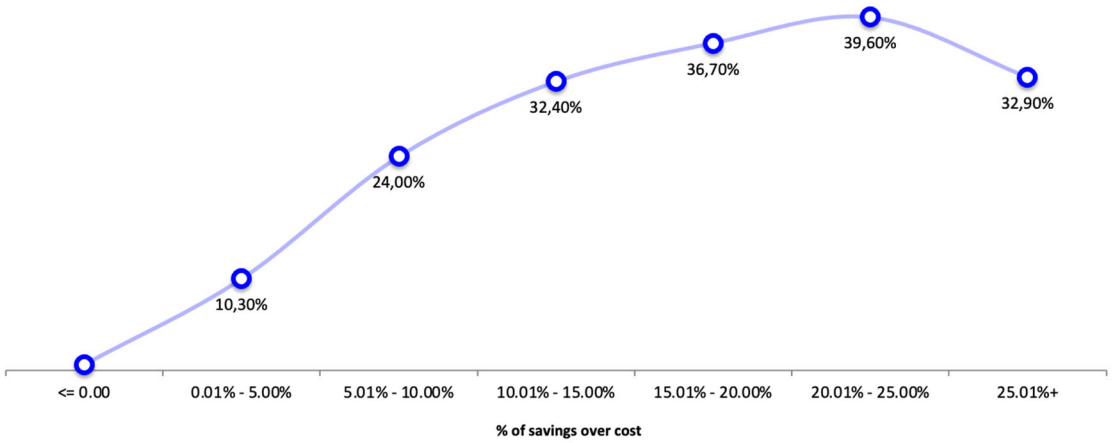
Uncertainty is expressed in three possible ways within TBS commercial data:

(i) a participant relying on *Which?* to estimate their annual consumption rather than using an actual bill,

(ii) a participant claiming to use a bill but entering a 'Round' amount, e.g. £500, and

(iii) a respondent being unsure whether or not they faced an exit fee from their existing energy supplier.

Figure 1.3. Switching rate per percentage of savings over cost



While all of these variables can be interpreted as signals of increased uncertainty, it is also possible to interpret them as negative signals of a participants' preparedness for TBS. In this interpretation one might think that individuals who have collected less information about their existing energy supply arrangements may be less interested in/committed to TBS and it is this which drives these participants' lower probability of switching.

The need for certainty may also lie behind the lower switching rate for those who were shown two offers rather than one. Being shown two offers rather than a single offer is associated with a lower probability of making a decision/switching.

These first results of the descriptive analysis of the commercial database gave us grounds to further investigate why these consumers decide not to switch if:

- They have enough savings, in terms of percentage and in absolute terms
- 13.8% face an exit fee, and exit fees are associated with energy deals that imply a participant has switched tariff or supplier at least once in the past. This fact, together with their "opt in" participation in a collective switching scheme, can suggest that they are consumers from the group of most engaged consumers in the energy market.
- They understand the individual benefits of switching; they can also perceive the collective benefit of doing so.

1.6. Pilot survey

In order to further investigate this cluster of consumers and to understand better what affects consumer actions, we launched an online survey in December 2012 targeting 1,000 people participating in The Big Switch campaign. A random group of consumers who did not switch using The Big Switch was selected, even though they were told they could save more than £63 per year by doing so.

The main focus of this pilot survey was, first to test the response rate of our respondents, and second to let the consumers express what the reasons for them not to switch were. The survey was designed using *Qualtrics*, a survey tool that allows the design of online surveys that is widely used by researchers[13]. The questionnaire (Appendix 1.2) used multiple conditional questions in order to allow all the possible instances.

The response rate was nearly 23%, with 227 completed questionnaires. This response rate was influenced by the facts that it is an online survey and that it was a questionnaire with open questions, where respondents have to write down most of the answers. In order to stimulate the respondents, we offered them the possibility of receiving a report with the main results of the survey (included in Appendix 1.3), which was requested by 66% of them.

There are some interesting quantitative results that obviously are maintained as illustrative because of the small size of the sample. Here we include those aspects we found relevant for the subsequent researches:

- 25% of people that did not actually switch through TBS, did switch shortly after this campaign. 68% of them stated that they were stimulated by it. For these consumers the switching process did take a bit longer, but they were switchers at the end of this process.
- Consumers that switched shortly after TBS learned also that it is useful to have the bill in front of them, because many of these did not have it during TBS but did have it when they actually switched.
- Another 22% of respondents had switched during the previous 2 years, while more than 25% had done so more than 2 years ago.
- 13.8% said they had never switched, and a very small proportion did not know whether they had ever switched.
- Of those who switched energy supplier up to 2 years ago (including those switching after TBS), most used price comparison websites, while 27% of them said that they contacted suppliers directly.
- Most respondents who switched energy supplier up to 2 years ago (including those switching after TBS) and who used price comparison websites or telephone lines had the bill in front of them while giving the details.
- Almost half of the consumers who did not switch after TBS declared that the reason was that they were not offered large enough savings. The average amount per year they said they would have needed to persuade them to switch supplier was £186.91. (It should be borne in mind this survey was sent only to those consumers who could have got a benefit of more than £63 per year.)

[13] Qualtrics survey tool was also used for the follow up survey.

Using the open questions responses of this pilot survey, we carried out a text analysis (using NVivo software). We identified and grouped those reasons reported by the consumers for not to switch:

- Complicated or unreliable switching process
- Exit fee or loss of other benefit
- Not enough savings
- Not important enough to dedicate time
- Other features of the deal or of the market
- Uncertainty about best deal in market
- Uncertainty about figures reported
- Was offered a better deal

1.7. Follow up survey

The results of the pilot survey were the ground for the design of the follow up questionnaire. The goal was to obtain data combining observations of actual switching decisions from TBS with additional survey responses from a large sample of TBS participants (70,000 consumers randomly selected from groups 3 and 4) contacted about nine months later, in spring 2013.

The questionnaire was designed with the clear objective of collecting more variables about the aspects identified in the analysis of the commercial database as affecting the switching behaviour (monetary savings and uncertainty or preparedness) and in order to include the new reasons identified in the pilot survey as potentially influencing the switching behaviour.

This questionnaire is divided in 10 different sections:

1. Respondent's characteristics
2. Household characteristics
3. Energy switching history
4. Characteristics of the energy contract
5. Monetary Savings
6. TBS specific factors
7. Concerns with the switching process
8. Time pressures
9. Non price preferences
10. Other utilities switching behaviour

A different questionnaire (Appendix 1.4) was designed for those that switched and those that did not switch through TBS which generated 18,401[14] responses (Table 1.3).

Table 1.3. TBS Follow-up survey details

Completed surveys	Switchers	Non-Switchers	Total
Total sent	16,756	53,245	70,001
Responses	4,796	10,153	14,949
Response rate	29%	19%	21%
Reminder sent	11,393	40,099	51,492
Responses	996	2,456	3,452
Response rate	9%	6%	7%
TOTAL RESPONSES	5,792	12,609	18,401
% over responses	35%	24%	26%
Want report	3,255	7,250	10,505
% over responses	56%	57%	57%

A descriptive analysis of the results is included in Appendix 1.5, which is the report produced for all the respondents of the survey that required so.

1.8. Insights from the TBS database for the analysis of switching behaviour[15]

Once the results from the follow up survey were received, they were merged with the data we had for each respondent from the commercial database. This way we created the main TBS database including the information from the commercial database and the follow up survey together.

Descriptives from the main TBS database related with switching behaviour

Socio demographic characteristics: the typical respondent of this survey is a male, aged between 65 to 74, with a high level of education (first degree or more). There is not much difference between the socio demographic profile of Switchers and non-Switchers with respect to gender; however, in terms of education there is a higher proportion of consumers with higher education in the Switchers group.

Household characteristics: There are a slightly higher proportion of Switchers that are buying their house with the help of a loan or a mortgage. There is a higher proportion of people working full time for Switchers, as well as a lower probability of households

[14] 12.414 complete responses.

[15] The tables and figures of this analysis can be found in Appendix 1.6. The findings reported in the section were the basis for the publication Deller et al (2021)

receiving disability benefits. The difference between Switchers and non-Switchers is higher with respect to energy related benefits, as 45% of Switchers do not get any while 29% of non-Switchers do.

Switching history: 29% of those who answered the survey switched supplier through TBS. Although they did not switch as part of TBS itself, 22% of respondents stated that they switched their energy supplier after TBS. A further 18% of respondents had switched during the previous 2 years, while more than 23% had done so more than 2 years ago. 7% said they had never switched and a very small proportion did not know whether they had ever switched. 5% of Switchers switched suppliers again after TBS.

Exit fee, penalties and loss of benefits: The proportion without exit fee is greater for Switchers (88%) than for non-Switchers (71%). As with the exit fee, the proportion without any potential penalty or loss of benefit is greater for Switchers (85%) than for non-Switchers (68%).

Attitudes towards TBS: most of the respondents took part in TBS with the aim of saving money in their energy bill; however for Switchers there are a higher proportion of them in this category. Non-Switchers show a higher preference for the reason "curiosity about the campaign" while the desire to encourage lower prices in this market shows a similar distribution between these groups. About the specific timing of TBS, Non-Switchers agree more often that it was an especially busy period for them. 77% of Switchers wouldn't like any other help for switching through TBS, however this proportion is 61% for Non-Switchers. The confidence about figures in TBS is higher for Switchers than for Non-Switchers.

Attitudes towards switching in general: the time the Non-Switchers are willing to dedicate to the switching process is higher that the effectively dedicated by Switchers.

Amount required to switch:[16] the minimum amount required for switching is considerably higher for Non-Switchers than for Switchers.

Existing supplier at the time of TBS: most of the respondents were happy with their existing supplier at the time of TBS, but this proportion is higher for non-Switchers. 26% of switchers were offered a better deal, but most of them without asking for it, and after that they decided to switch through TBS. For the case of non-Switchers, 21% received a better deal, but most of them because they asked for it, and then 55% of them changed their tariff or method of payment with their existing supplier.

[16] The design of the questionnaire presented four different ways of collecting this information. The reason was to investigate whether this different design influenced the answers. We distributed the sample randomly among the four different groups.

Reasons persuading to switch: large savings becomes more important for non-Switchers, being the one that presents the higher difference between the two groups, together with ethical or environmental reasons, where Switchers present a preference. Being happy with the current supplier is also significantly preferred by Switchers.

Financial factors: energy cost is similar for switchers and non-switchers, but savings are higher for those switching through TBS both in absolute and relative terms.

1.9. Selection of the final sample

This group of consumers differs from the average consumers (Table 1.4) and the analysis of the characteristics of the respondents highlights that the TBS population is relatively homogeneous. We cannot generalise the results to a broader population but we can investigate which are the reasons for switching (or not) in a group of more active consumers that can be identified as an upper bound in terms of engagement with the market.

Survey respondents are majority male, older, wealthier and more educated people than the average Great Britain population.

Table 1.4. Demographic and socioeconomic characteristics of the survey respondents

Statistic	Wave 1 Respondents	Equivalent Figure for Great Britain[4]
Age group containing median age[1]	55-64	35-44
% Male	72.6	48.3
% With first degree or higher	60.2	23.0
% Who rent their home	6.6	35.5
% Households receiving a disability benefit[2]	7.6	9.8
Income category containing median household income[3]	£35,000-39,999	£30,000-34,999
Total Number of Observations	12,414	-

1 In Wave 1, age data were only available for 8,533 respondents.

2 In Wave 1, respondents were simply asked whether they received disability benefit.

3 In Wave 1, no specific question was asked regarding income. The figures reported are approximations based on the median income of inhabitants of the six digit postcode area where the respondent lived (CACI).

Also, those who responded to the follow-up survey were a self-selecting subsample of those who took part in TBS, leading to potential important differences between the main and survey samples. Other indications of special characteristics of the new sample generated from the respondents of the follow up survey with respect to the participants in TBS with Complete Data are (table 1.5):

- **More active individuals**: they might be positively affected by their experience at TBS, as the percentage of participants switching supplier at TBS is 24%, while in the follow up survey it reaches 33%.
- **Greater preparedness and more interested in/committed to TBS**: the percentage of participants using estimated bill at TBS is 27%, while in the follow up survey it reaches 21%.
- **Higher switching rate**: with lower savings offered, lower percentage of people obtaining savings from the TBS, higher percentage of people facing an exit fee, and higher percentage of people paying for their electricity by Direct Debit.

Table 1.5. Summary statistics of different group of consumers at TBS[17]

Statistics[5]	Participants in TBS with complete data	Participants with complete Data analysed	Survey Respondents	Survey Respondents analysed
% Switching supplier at TBS	24.1	27.2*	33.0	41.9^#
% Offered a saving by TBS	874.4	100*	83.2	100#
Median bill size (actual and estimated) (£)	1,184	1,178	1,152	1,162
% Using estimated bill[3]	327.3	27.7*	20.7	20.2^
% Facing an exit fee	14.4	11.2*	19.1	16.5^#
Median saving offered by best supplier (£)[1]	120.45	114.34	111.48	106.67
Median saving as % of existing bill[1]	10.8	10.4	10-3	9.9
% shown two offers	47.2	47.8*	45.8	49^#
% Paying for their electricity by direct debit[2]	90.6	91.5*	92.9	97.3^#
% Single energy supplier before TBSD	91.4	100*	92.5	100#
% Single supplier household on a dual fuel tariff[4]	87.7	87.4*	80.7	87.8#
Total number of observations	146,659	111,410	15,329	7,367

[17] Deller et al (2021)

* Indicates the statistic for analysed participants is significantly different to the statistic for all participants with complete data at the 5% level.

^ Indicates the statistic for the analysed survey respondents is significantly different to the statistic for analysed TBS participants with complete data at the 5% level.

# Indicates the statistic for analysed survey respondents is significantly different to the statistic for all survey respondents with complete data at the 5% level.

[1] The median saving was calculated based only on those individuals who were offered a positive saving as part of TBS. All those in the analysed datasets had positive savings. The number of observations with positive savings in the 'Participants with complete data' dataset is 123,739 and in the 'Survey Respondents' dataset is: 12,750.

[2] The analysed survey respondents consisted solely of those respondents who asked to be entered into the online Direct Debit auction (the vast majority of respondents). A person who entered the online Direct Debit auction did not need to be paying by Direct Debit for their pre-TBS energy supply.

[3] This percentage combines individuals who entered a 'Round Amount' for their bill, possibly suggesting they estimated their bill and individuals who had their bill estimated by Which? on the basis of their dwelling's characteristics. All other individuals consulting their bills directly.

[4] Single supplier households consist of those households who before TBS only had an electricity connection or received both their electricity and gas from a single supplier. A 'Dual Fuel' tariff refers to tariffs where consumers buy both their electricity and gas from a single supplier as part of a combined deal.

[5] For the statistics listed as medians, statistical tests comparing the different groups of participants/respondents have not been performed.

The sample we are analysing is clearly non-representative of the whole population, as the selection is conditional on voluntarily answering the survey or voluntarily sharing personal information. We cannot have the insights from those who did not participate in the initiative, but we can take advantage of having a selected group of consumers that can be considered as an "upper bound" group and examine their behaviour. The decision was to select the subset of participants most likely to switch in a situation where switching is relatively easy.

To this end we refined even more the selection retaining those: (a) for whom the auction outcome offered a monetary saving over their existing supply deal; (b) who had a single energy supplier at the time of the auction; (c) who had opted to take part in the online Direct Debit[18] auction; (d) respondents who identified 'to save money' as one of their motivations for taking part in TBS. The final sample contained 7,367 questionnaires (Table 1.5).

All the dataset created for the research about switching behaviour are kept at UK Data Archive Study Number 7876 Consumer Energy Supplier Switching: Data from 'The Big Switch' and Subsequent Surveys, 2012-2014 (Appendix 1.7).

[18] Direct Debit is the predominant payment method in Great Britain and involves monthly deductions from a bank account to spread the estimated cost of the energy evenly over the year, with an annual reconciliation from metered consumption. Note that members of this group were not necessarily paying by Direct Debit before they entered the auction.

Chapter 2. Do collective energy switching campaigns engage vulnerable households? Evidence from *The Big Switch*[19]

2.1. Introduction

One of the consequences of the economic crisis that started in 2007 is that the issues of *fuel poverty* and *vulnerable consumers* took centre stage at the policy debate (see Liddell, 2012 in the special issue of *Energy Policy* on fuel poverty back in 2012). Until Boardman, (1991), there was little awareness that a sizable proportion of the population was suffering from a distinctive form of poverty, i.e. the inability to access appropriate energy services in the home (Boardman, 1991). Fuel poverty, as it came to be known, was first established in the academic and policy spheres within the UK and Ireland (Liddell, 2012) and then gradually expanded to the European Union (Bouzarovski et al, 2012), where fuel poverty is sometimes referred as energy poverty. In the US, although energy poverty has not yet been recognized as a distinct problem by the federal government (Bednar and Reames, 2020), it is gaining attention (Mohr, 2018). In developing countries, the term energy poverty emphasizes the supply-side (e.g. infrastructures) and captures inadequate access to energy (Pachauri and Spreng, 2004), as households keep using traditional energy sources, wood and carbon, and lack of access to electricity.

With fuel poverty at the centre of the public policy arena, there has been an expansion of scholarship and policy to define indicators that describe which households are energy poor, in an attempt to help policy makers to tackle energy poverty. Moore (2012) and Romero et al (2018) contain a nice discussion on how indicators can assist policy. In this paper, we add to this literature by analysing the effectiveness of the first collective switching scheme in UK, The Big Switch in 2012, to mobilize vulnerable households to engage into cheaper energy tariffs.

The basis of collective purchasing schemes is to bring together a group of customers so that suppliers can deliver lower prices to the block of customers. Once customers have registered for the scheme, suppliers are invited to enter into a reversed auction, by placing their bids to the group of customers and the winner is the firm offering the best tariff. Registered customers are finally invited to switch to the winning offer. Collective energy switching has been used in Australia, the Netherlands, the UK, and Ireland. In UK, they became very popular in the British retail energy market after government endorsement in 2012 and funding from the Department of Energy and Climate Change under the scheme Cheaper Energy Together. More recently, Ofgem –the government regulator for gas and electricity

[19] Some of this research was undertaken while I was based at the Centre for Competition Policy at the University of East Anglia. I gratefully acknowledge funding from the Economic and Social Research Council (ESRC) under grant number RES–578–28–0002. The content of this chapter has been published in the journal *Energy Policy* (Moniche-Bermejo, 2022)

markets in Great Britain- has conducted a series of five Collective Switch Trials in 2018 and 2019 (see Ofgem, 2019b).

From the demand side and from a policy point of view, the evaluation of the effectiveness of these schemes is a key issue if one is to recommend their use as a means to make consumers get cheaper energy deals, as high energy prices are one important factor in any definition of fuel poverty. This is important in the light of recent events, with the outbreak of COVID-19 and the subsequent economic downturn, income losses and the surge in energy prices.

There is an additional advantage of collective switching initiatives from a policy point of view, which refers to the supply side of the market. It allows small energy companies to enter into the market and to enlarge their base of customers, increasing competition.

The evaluation of the collective initiatives is typically done either thorough follow-up surveys to participants or by directly collecting information from participants who voluntarily accept to share the requested information with the organising institution. For example, Deller et al (2021) complemented the The Big Switch database with data from two follow-up surveys to gain knowledge about the sociodemographic attributes of participants. The Department of Energy and Climate Change (2013) required the schemes that were granted funds to collect sociodemographic information of the participants in order to evaluate their effectiveness.

The first thing to note is that the analysis based on these data provide a biased measure of success –as they are conditional on voluntarily answering the survey or voluntarily sharing personal information. However, this is not the biggest problem. This data provides information conditional on participation; that is, from the participating households in the scheme –and eventually switching-, how many were vulnerable? However, from a policy point of view, and in order to fight fuel poverty, it seems that the relevant piece of information is the exact opposite: conditional on experiencing fuel poverty, how many registered for the collective scheme?[20]

In this paper, we apply an econometric methodology -zero-inflated counting models- to evaluate how successful *The Big Switch* was to mobilize different types of households, without the need to rely on any ad hoc survey or questionnaire; rather we make use of households' actual choices: i.e., by analysing how participating households distribute through the UK. Zero-inflated counting models are standard econometric tools for analysing counting variables in a variety of fields, such as epidemiology (Arab, 2015), animal health (Vergne et al, 2014), engineering (Lambert, 1992), agriculture (Isgin et al, 2008), public health (Rose et al, 2006) and social sciences (Böhning et al, 1997) among others.

[20] Surveys miss an important part of the population: those who did not participate in the initiative.

To apply this methodology, we require three pieces of information.[21] First, the number of registered households by geographical unit (postcode and output area) in the UK. Second, the socioeconomic and demographic attributes of households by geographical unit in the UK. Third, the attributes of households that are more likely associated with fuel poverty. The households' attributes are available from official statistics sources. The final piece of information is provided by the large literature on fuel poverty indicators and vulnerable households.

An additional benefit of the proposed methodology is that it estimates two different processes: the zero-excess process (the awareness process) and the true-counting process (the engaging process). Hence, we can assess how well the collective energy switching initiative did in reaching households -first process- and in engaging households -second process- and how this is linked to the households attributes, revealing which attributes are facilitators or inhibitors of the success of the collective switching initiative across UK.

We find that none of the vulnerability dimensions as defined by the UK regulator impacts negatively on the awareness. On the contrary, rural areas and those belonging to the lowest income quartile are significantly more aware of The Big Switch initiative. But one thing is be informed, and The Big Switch managed well by promoting the initiative widely, and a different thing is to make consumers act on the information. In the registration process, our analysis reveals that rural areas and those with a larger percentage of senior population are more active. The negative side is that there are two types of households that are extremely disengaged: those with children and those who are deprived. By extremely disengaged we mean households that are less aware and that conditional to awareness, register less. Our analysis reveals that the effect of vulnerability on engagement is cumulative and that special emphasis should be placed on these two types of households when fighting energy poverty using collective switching.

The rest of the paper is as follows. Section 2 reviews the variety of methodologies and indicators of fuel poverty, and the type of households that are more likely to be fuel poor. Section 3 presents the collective switching initiative that we analyse in this paper: *The Big Switch*, the econometric methodology and hypotheses. Section 4 presents the econometric results. And Section 5 discusses the policy implications and conclusions.

[21] We thank the Center for Competition Policy, CCP, for providing us with the information generated by *The Big Switch*.

2.2. Fuel poverty, vulnerable households and public policy

The extensive research on fuel (and energy) poverty offers a collection of methodologies and indicators (see Heindl and Schüssler, 2015 for a classification). In this paper, we do not aim to providing a comprehensive review of all indicators, but rather we are interested in the aggregate picture that the different indicators shape regarding which type of households (e.g. which characteristics) are most likely to be associated with fuel poverty.[22]

In the literature, there are subjective indicators, where households are directly asked whether they can afford to keep their home adequately warm. This is the case for example, in the European Quality of Life Survey, Eurofond (2017). In addition, there are objective measures defined in relation to the affordability of energy that result from the combination of three factors: low household income, energy inefficient housing and high energy prices. An early example was used in UK in the seventies (Lidell, 2012), where a household is defined as fuel poor if their expenditure on energy services is greater than two times the median expenditure on energy (Liddell, 2012). The 10% rule, found in the UK Fuel Poverty Strategy 2001, is another example, where a household is defined as fuel poor if it "would need at least 10% of its income in order to heat the house to an acceptable level of warmth". Others propose to use income after housing and fuel costs, and the use of a minimum income standard, and therefore a household would be subject to fuel poverty if the available income after housing and fuel costs is insufficient to meet the minimum income standard (Moore, 2012).

The academic literature offers a description of the type of households that are most likely to be fuel poor. Older people, families with children and households with disabilities and long-term illness present above-average rates of fuel poverty (Bouzarovski, 2014). According to the European Project "European fuel poverty and energy efficiency" (EPEE, 2014), fuel poverty disproportionally affects financially disadvantaged households, on low incomes, single parent families with dependent children, retired people, unemployed or poorly paid jobs, and those dependent on social security benefits. Housing tenure is also important, as tenants are more likely than property owners are to be fuel poor (Romero et al, 2018).

The vulnerability considerations on fuel poverty have been integrated in the policy action, so public policies aimed at reducing fuel poverty have been targeted to vulnerable consumers. An early example is the 2001 *Fuel Poverty Strategy* in the UK, where vulnerable households are defined as those containing "older householders, families with children and householders who are disabled or suffering from a long term illness" (DTI, 2001). Also, the 2005 *Social Action Strategy* by Ofgem, where there is a special emphasis on protecting the interests of customers who are

[22] Heindl (2014) illustrate using household data from Germany how different definitions of fuel poverty yields different results with respect to which households are identified as fuel poor.

disabled, chronically sick, of pensionable age, on low incomes or living in rural areas.[23]

These concerns are embedded also in the directives of the European Commission concerning rules for the internal market of electricity (2009/72/EC) and gas (2009/73/EC), where it is explicitly stated "Member States shall take appropriate measures to protect final customers, and shall, in particular, ensure that there are adequate safeguards to protect vulnerable consumers".

The principal policies to tackle fuel poverty are a combination of income support (a short term strategy in the form of financial interventions using the social welfare system), energy efficiency investments (a long term strategy) and the provision of energy at lower costs (Bouzarovski and Petrova, 2015).[24] The latter is at the heart of the deregulation process of energy markets (Pollitt, 2012), where an increase in competition is expected to drive prices down. This process has taken place all over the world, both in developed countries (Jamasb and Pollitt, 2005) and in the developing world (Urpelainen and Yang, 2019).

However, it is not always the case that deregulation automatically increases market competition. It is well-known that despite the possibilities that deregulation might offer to consumers, if they do not engage with the market, then the competitive pressure weakens and providers might evade tougher competition. Consumer inaction is widely observed in UE (Bouzarovski, 2014), US (Hortaçsu et al, 2017) and in the UK, (Deller et al, 2021, CMA, 2016) and it poses a challenge to policy makers, because customers who have not recently switched providers are faced with increasingly higher prices. This is especially true for vulnerable consumers, who suffer disproportionately because of their inactivity (Lorenç et al, 2013 and OFGEM, 2013).

2.3. *The Big Switch*: Data, methodology and hypotheses

There are various reasons behind consumer inactivity: the existence of (high enough) searching costs (Giulietti et al, 2014), the existence of (high enough) switching costs (Klemperer, 1995) and the existence of (permanent) cognitive biases (OFGEM, 2011).[25]

To overcome these barriers, several initiatives have been developed. In order to facilitate the access of information about products available in the market, regulators have forced companies to disclose such information (Fletcher, 2019 and He and Reiner, 2018). In order to ease the assessment of the information, there are

[23] Rurality is considered as a vulnerability dimension by Ofgem because in rural areas, there is a more limited choice of energy sources (see the analysis of the differences between rural and urban areas in terms of fuel poverty in Roberts, et al, 2015).

[24] In the developing world, an additional policy is supporting the transitions from traditional to modern energy fuels.

[25] He and Reiner (2017) analyse the influence of psychological factors on switching behaviour.

price comparison websites that make comparisons and determine which product or service best suits consumer preferences (Gamper, 2012 and Antal, 2020). Finally, in order to make it easier to act on the collected information, regulators design policies aimed at lowering switching costs (Maicas et al, 2009).

Collective switching schemes are initiatives that take a step further. It is not only a switching intervention but it plays a proactive role in the market as the participating consumers, with an increased buyer power, can get better deals from providers. Collective switches require the intervention of a third party as an intermediary between consumers and energy providers.

We study the largest nationwide collective switching schemes in UK, and one of the first, conducted in May 2012, *The Big Switch*. There were two organisers: *Which?,* a UK consumer association with more than half a million members, and the campaigning organisation *38 Degrees*, with a database of nearly a million members.

The first step in a collective switch is the *registration*. The organiser asks for some basic information. In the case of *The Big Switch*, consumers had to declare an interest by fulfilling a questionnaire at *Which?* website giving name, email account and postcode, before 31 March 2012. More than 200,000 GB households expressed their interest to participate at *The Big Switch*. In a second step, the organising parties contacted the registered users by email asking for *additional information*, typically related to their consumption profile. In this step, *The Big Switch* asked for details related to individual current gas and electricity tariffs and providers. This step took place before May 2012.

With this information, the organizers invited energy companies to take place in a *reverse auction* (third step) that took place on 11 May 2012. In the case of *The Big Switch*, organizers imposed some restrictions; in particular, that they could not discriminate geographically, and these restrictions deterred some suppliers. Five companies joined the auction, including three of the six leading providers. The winning bid came from the Cooperative Energy.

Once the deal was secured, all registered customers were notified by email, asking them to choose whether or not to accept it (stage four). Because the leading providers typically discriminate geographically, it happened that the geographically-uniform tariff by the Cooperative Energy was not cheaper than some local tariffs. In this case, the e-mail sent to the registered users included information about the two tariffs, the cheaper local tariff and the winning tariff from the Cooperative Energy.

Deller et al (2021) analyses the capacity of *The Big Switch* to make registered customers to switch to the auction-winning offer. The most striking finding is that switching rates were surprisingly low, with an average of 30%, implying that energy providers captured nearly one third of the savings ready available to the participants.

The econometric methodology

In this paper, we aim at modelling how many households registered for *The Big Switch* in each geographic unit, as a function of the average sociodemographic characteristics of the geographic unit.

It is important to take into account the awareness process of the initiative, as registration is not a choice if consumers do not know about the possibility of taking part in the collective initiative. Hence, the analysis needs to differentiate between the *awareness* process and the *true* (registration) process. To that end, we use zero-inflated count models (Cameron and Trivedi, 2013), where the unit of observation will be the number of households that registered for *The Big Switch* by geographic unit.

Zero-inflated count models are used in many fields to analyse count data. It assumes that the distribution of the observed count follows a mixture of two separate data generation processes: one for the "true" counting process -either a negative binomial or a Poisson process- and other for the extra-zeros –either a logit or a probit-. We run zero-inflated negative binomial (ZINB) with a probit specification, although our results are robust to different specifications. In the ZINB specification, the probability function can be expressed as follows

$$Prob(Y_i = y) = \{\varphi_i + (1-\varphi_i)g(Y_i = 0)\ if\ y = 0\ (1-\varphi_i)g(Y_i) \qquad if\ y > 0$$

The link function φ_i can be specified as a logistic function $\varphi_i = \frac{exp(\xi_i^{\alpha})}{1+exp(\xi_i^{\alpha})}$ (logit specification) or the standard Normal cumulative distribution function $\varphi_i = \Phi(\xi_i^{\alpha})$ (probit specification), where $\xi_i^{\alpha} = \alpha_0 + \sum_i \quad \alpha_i x_{1i}$.

The function $g(Y_i)$ is the negative binomial distribution given by

$$g(Y_i) = Pr(\mu_i, \alpha) = \frac{\Gamma(Y_i + \alpha^{-1})}{\Gamma(\alpha^{-1})\Gamma(Y_i+1)}\left(\frac{1}{1+\alpha\mu_i}\right)^{\alpha^{-1}}\left(\frac{\alpha\mu_i}{1+\alpha\mu_i}\right)^{Y_i}$$

with $\mu_i = exp\left(\beta_0 + \sum_i \quad \beta_i x_{2i}\right)$. The explanatory variables x_{1i} and x_{2i} need not represent the same set of covariates.

In our application, this model implies that two different processes can explain an observation of a geographic unit without any household registering for *The Big Switch*: the *true counting* process and the *excess-zero* process. The *true counting* process captures the behaviour of those households that, knowing the existence of *The Big Switch*, had the choice to join or not, and decided not to. The *excess-zero*

process captures the behaviour of households that were not aware of the existence of *The Big Switch* and therefore had no possibility of joining *The Big Switch*.

Data

Our econometric strategy needs the specification of the explanatory variables for both the excess-zero process and the true counting process. We like to interpret the explanatory variables as risk factors that hinder or ease the registration for collective switching campaign throughout the UK geography. The risk factors that we consider are those characteristics of the geographical units that are associated with vulnerable households as well as some features related to the dissemination process of *The Big Switch*.

In our analysis, we restrict attention to households from England and Wales because the Office for National Statistics (ONS) is only responsible for Census statistics in England and Wales. Our database contains information about 156,758 households that registered at *The Big Switch*. We conduct our analysis at two different geographical levels: postcode and output areas. In the following, we refer to the output area level,[26] because there is more information available for constructing the covariates. The analysis at the postcode level can be found in the Appendix 2.

Table 2.1. Frequency table of the number of households joining TBS per output area

Number of households joining TBS	Number of Output Areas	Number of households joining TBS	Number of Output Areas	Number of households joining TBS	Number of Output Areas
0	95,227	6	816	12	3
1	46,364	7	327	13	2
2	22,124	8	131	14	1
3	10,020	9	47	16	1
4	4,428	10	19	20	1
5	1,859	11	11	Total number	181,381

The database contains information on 181,381 output areas in England and Wales. There are 86,154 output areas in which at least one household sent a registration email to *The Big Switch*, while there are 95,227 output areas with no single household expressing any interest in the campaign. The number of registered

[26] Output areas (OA) are the building block of Census geography, and they are built from postcode units. OAs were introduced for the 2001 Census to provide a stable small area geography for the production of local area statistics. In an OA, the population cannot fall below 100 people or 40 households and cannot exceed 625 people or 250 households.

households averaged by output area is 0.8642, with standard deviation 1.2185. The standard deviation is larger than its mean; an indicator of over-dispersion. To visualize the excess of zeros, Table 1 displays the distribution of output areas by the number of households which joined TBS. In 52.50% of the output areas no single household joined TBS (95,227/181,381). The information in Table 1 must be read as follows. There were in England and Wales 22,124 output areas with exactly two households expressing their interest in *The Big Switch*.

For the explanatory variables to include in the awareness process, details on the dissemination campaign deployed by the two organising institutions become highly relevant. They used private (or internal) and public (or external) channels to disseminate news about the initiative. Both organisations delivered information to their current base of members using their email addresses (with three reminders) as well as the *Which?* magazine (full page advert in the March issue and a follow-up full-page advertising in the April issue). Besides these private channels, both organisations went public and launched extensive media campaigns across press, TV and social media. One of the most important element was five energy events that were held in Glasgow, Cardiff, Birmingham, Manchester and Reading. In addition, the organising institutions encouraged members to recruit as many people as possible, by sending letters to their MP, writing to local papers or telling other people who lived nearby. The incentive to do so was powerful: the larger the base of registered users, the more the bargaining power to get the best deal.

To account for the private channel, internet connection and membership of any of the two organising institutions are variables that we need to incorporate in our econometric analysis. For internet connection, we have computed the internet penetration by postcode, defined as the percentage of households with broadband connection over the number of occupied households in the postcode. We have used data from the UK's communications regulator OFCOM based on a snapshot of data provided by the largest fixed broadband providers in the UK for the period of June to July 2012. Once internet penetration is computed for each postcode, we aggregate the information for each output area. Unfortunately, we do not have information on how members of *Which?* and 38 Degrees distribute by geographical unit. We have constructed a proxy for membership to the two organising institutions. As organizations, both *Which?* and 38 Degrees are organizations comprising well-informed and active (prosocial) consumers, we have computed a *prosociality* index, equal to the percentage of households with someone offering unpaid care per output area, as a proxy variable for *Which?* and 38 Degrees membership.

Incorporating the external channel in our analysis is more complex, as we don't have detailed information of all the activities and places where the two organising institutions included media advertisements, etc. We have included dummies for the five cities that hosted energy events related to *The Big Switch*.

Table 2.2. Explanatory variables at the output area level. Summary statistics

Variable	Output areas without registered households		Output areas with registered households	
	Mean	Std. Dev.	Mean	Std. Dev.
Number of occupied households	127.317	29.027	132.123	27.720
Dissemination				
Internet penetration	71.457	16.573	78.044	11.423
Percentage of households with someone offering unpaid care	10.103	3.318	10.860	3.348
Information campaign (dummy)	0.042	0.201	0.026	0.160
Vulnerability (OFGEM)				
Rural (dummy)	0.145	0.353	0.238	0.426
Household average income (in thousands)	32.965	9.610	39.511	10.072
Lowest income quartile (dummy)	0.362	0.480	0.125	0.331
Percentage of households with someone aged 65over	15.942	10.197	18.642	10.031
Percentage of households with someone disabled	27.469	9.426	24.292	7.687
Vulnerability (Additional)				
Percentage of highly deprived households	7.281	5.722	3.935	4.019
Percentage of households with lone parents	13.749	7.914	9.646	5.697
Percentage of households with someone unemployed	35.108	13.377	31.861	11.760
Percentage of Non-UK residents	13.945	15.335	11.414	12.180
Percentage of households with shared accommodation	0.339	1.860	0.297	1.571
Percentage of households with children	30.204	11.730	28.090	9.764
Energy related variables				
Percentage of households with no central heating	2.887	3.144	2.412	2.742
Percentage of households with electric central heating	8.778	13.773	6.950	10.428

Percentage of households with three or more rooms	56.870	23.976	66.025	21.972
Percentage of households living at their own homes	26.273	16.123	36.407	16.120
Total number of output areas	95,227		86,154	

Regarding the vulnerability dimensions, we have a rich set of variables. First, we have information at the output area level for the four vulnerability dimensions as defined by OFGEM: low income, rural, disabled/sick and aged. We have estimations of the average household income by output area provided by CACI for the year 2012. Using that information, we can identify which output areas have the lowest average income, by defining a dummy that takes value 1 if the output area belongs to the lowest income quartile. The Census 2011 gives information of whether an output area is rural or urban[27]. The Office for National Statistics also provides information on elderly population, e.g., we include the percentage of households with someone aged 65 or over by output area, as well as the percentage of households with someone disabled by output area.

We have information about additional vulnerability attributes. One such variable is household deprivation. The Office for National Statistics defines four dimensions of deprivation, based on unemployment, low education, bad health and disability and housing overcrowding or no central heating. Unfortunately, Office for National Statistics does not say in which dimension households are deprived but classifies households by the number of dimensions in which they are deprived. We have included the percentage of households highly deprived by output area, meaning that they are deprived in at least three dimensions. Also, some other dimensions that might be indicative of vulnerability, such us lone parents, unemployment, non-UK residents (for capturing immigration) and shared accommodation.

Finally, we have also collected information on variables associated with the energy consumption profile that might affect how active households are on the energy market. We include home ownership and whether there are children in the household. We also account for the size of the household -percentage of households with three or more rooms and for the way in which homes are heated -percentage of households with no central heating and percentage of households with electric central heating. Table 2.2 displays the summary statistics of the independent variables that we have considered in our analysis.

[27] The ONS criteria to treat an Output Areas as "urban" is that the majority of the population of an Output Area lives within settlements with a population of 10,000 or more.

Data and methodological weaknesses

The primary source of information for our analysis is the number of households participating in *The Big Switch* for each postcode in England and Wales in 2012. Note that this is not a random sample of the UK households but it is the result of a campaign that *Which?* and *38 Degrees* run to involve a large number of customers to negotiate better tariffs from energy providers. This is not a problem because we use this information to evaluate how well *The Big Switch* did in engaging households as a function of their characteristics.

What it is problematic is that we lack information about the distribution of members of the two organising institutions geographically. We understand that this is sensitive information that campaign organisers wanted to keep private, and that this lack biases the analysis, as membership information is very likely to affect the awareness of the initiative all over UK as members received direct information via email from the organisers about *The Big Switch*. The remedy that we have found is imperfect –we use a proxy in terms of the *prosociality* of the population residing in an area, but we believe that it helps to alleviate the problem because the prosociality index and the membership are expected to be highly correlated.

A second weakness that can bias the results is related to the lack of control of the external channels of dissemination of the collective campaign. The organisers were very active in promoting the initiative through TV ads, local and national press and social media and we did not have this information. We believe that the proxy that we have incorporated, a dummy for those cities that held big energy events is weak, but it is the only information available in order to include the effect of those events.

Third, word-of-mouth is another aspect of the dissemination process that it is likely to affect the awareness of the collective initiative and that is not included in our methodology. As per the true counting process, the methodology assumes that events –a household registering for *The Big Switch*- are independent. However, clearly this is not the case if a registered household talks about joining the initiative with their neighbours. This spatial spillover effect is not contemplated in the econometric estimation. Still, we believe that it is not a fatal problem as for example, 80% of the postcodes in England and Wales[28] had either 0 or exactly 1 registered household for *The Big Switch*.

Fourth, there is a trade-off between the aggregation level of the analysis and the availability of statistical information about households by geographical area. At a deeper level, postcodes, the estimates are expected to be more accurate, because the information about sociodemographic variables that we assign to the households within a given postcode will be more representative the lower the number of households. And at the postcode level, this number is small, with a median of households is 17. On the negative side, we can only obtain information for a bunch

[28] There are around 1,300,000 postcodes in England and Wales.

of sociodemographic attributes. We like to think of the estimated coefficients at the postcode level (included in the Appendix), and specially the sign, as a reference point. And second, we expect to find consistent results at least for the direction of the impact of the sociodemographic attributes related to consumer vulnerability between the econometric results at the postcode level and larger geographical areas. This will reassure us that the results found in larger geographical areas will not be an artefact of the aggregation of data.

Hypotheses

In the literature, there are many studies that shade light into the association between characteristics of the households and their behaviour in the energy market. It is useful to classify them in four groups.

The first one is comprised of studies based on interviews, case studies and/or interventions with individuals belonging to vulnerable groups (for example, Mould and Baker, 2017, Shirani et al, 2020, Lorenç et al, 2013). These papers document the difficulties that vulnerable consumers, especially older people, low-income and larger households, face in coping with energy poverty and in making the transition to cheaper deals. Shirani et al (2020) and Lorenç et al (2013) emphasize for example the scepticism and apathy of vulnerable consumers for switching or/and discovering the existence of better tariffs. Most of them had not switched previous to the intervention due to lack of knowledge and not all of them switched to cheaper tariffs when shown how to do so, mainly because of apathy and the hassle of switching.

These insights are useful, but from a policy point of view it tells nothing about the ability of vulnerable consumers to switch compared to non-vulnerable ones, that make case for the former to qualify for special policy measures. We emphasize that it is important to compare the behaviour of vulnerable and non-vulnerable and document in which particular dimensions there are a significant difference in behaviour. This is the kind of analysis offered by the remaining group of papers.

The second type of studies use data from questionnaires but delivered to the general population, generating a random sample and estimating switching and awareness processes. These processes are typically linked to the socioeconomic characteristics of the participants, allowing the identification of the features that affect awareness and switching behaviour. An example is Giulietti et al (2005). They analyse the gas market in UK in late 1999, when consumers started to have the choice to change suppliers. They use data from two questionnaires to almost 1,900 households all along UK and estimate a double hurdle model in which consumers first have to be aware of the choice to change suppliers and then they could search and switch if an alternative supplier offered a better deal. For the awareness model, they find that the only characteristic related to vulnerable consumers that was significant was old age, which reduced awareness consumers, but neither disability nor low income had

any impact on awareness. But once elderly customers were aware, they were as likely to change suppliers as aware non-elderly customers. People living in rural areas are less likely to switch but no effect on switching rates is associated to either low-income or among people with disabilities.

The third group of papers study consumer behaviour by analysing real data in the energy market. Kleit et al (2012) and Hortaçsu et al (2017) study the effect of retail energy deregulation in US markets using real data with an emphasis on switching behaviour. Using the postal address of consumers, both papers complement the data with socio-demographic characteristics using Census statistics. Hortaçsu et al (2017) analyse the residential electric choice in Texas in 2002-2006 and find that unawareness, which is associated to not searching for alternative providers, and switching costs are quite large, implying that a large fraction of consumers remain with their incumbent provider after four years of the beginning of the deregulation period. Elderly consumers are less likely to switch at the end of the four-year period of analysis and consumers with electric heating are more likely to switch. Kleit et al (2012) use monthly data from more than one million customers for the electric market in Pennsylvania from December 2008 to October 2010. They do not consider any awareness process and estimate a probit model for the decision to switch providers (and a hazard model for when to switch). They find that consumers from urban communities and with high income and less unemployment were more likely to switch. Also, more senior members of the population were not found to have lower switching rates than younger communities.

Dressler and Weiergraber (2019) analyse choices of electricity contracts in Belgium during the period 2012-2016, with a focus on the use of price comparison websites. They have a two-stage process in which consumers decide how much information to search before choosing a contract. They complement the real choice data with a survey data on households' attitudes towards the energy market that allow the identification of some demographic types, in particular the age of the consumer. The result that it is of interest to us is that seniors are less aware (they search less) and switch less. In addition, they report a positive effect of broadband internet penetration on consumer engagement in the energy market as well as a positive effect of the information campaign by the Flemish regulator.

This review of the literature yields (mixed) results about the impact of the characteristics associated to vulnerability on consumer inactivity in the energy sector. These differences may arise out of the different methodologies, different countries (UK, US, Belgium) and/or different characteristics of the energy markets. In the following, we collect our main hypotheses, summarising the results from previous literature, starting with the features of the dissemination process of *The Big Switch*.

We hypothesize that internet penetration, membership to one of the organising institutions and the information campaign to reduce both the hurdle to be aware of

the existence of *The Big Switch* and the hassle to register online. Dressler and Weiergraber (2019) support this and in relation to the UK market, we find evidence from annual surveys of British households commissioned since 2007 by the UK energy regulator to understand customer engagement with the GB Energy Market. They consistently find that internet connection is a strong facilitator for awareness and switching (Ipsos, 2013 analyses engagement and switching behaviour in the year 2012, the year that *The Big Switch* was run).

Hypothesis 1. **Dissemination and registration.** *Internet penetration, membership and public campaign will have a positive impact on awareness and on registration for The Big Switch*.

Regarding the vulnerability dimensions, we state two hypotheses, starting first with the dimensions related to the vulnerability criteria by Ofgem.

Hypothesis 2. **Awareness**. *Old people will be less aware of The Big Switch, but all others features –rurality, disability and low-income- will have no impact on the awareness of The Big Switch, compared to non-vulnerable groups.*

Hypothesis 3. Registration. *Elderly, rurality and low-income will affect negatively to the registration process for The Big Switch, while disability will not, compared to non-vulnerable groups*.

We also contemplate additional vulnerability dimensions and other variables related to energy consumption. Unfortunately, we can only count on the experience reported on case studies and questionnaires administered with vulnerable consumers (the first group of papers we mentioned above), because empirical papers find hard to incorporate this kind of socioeconomic data into their analysis. We include them in one general hypothesis, anticipating a negative effect on consumer engagement with the collective initiative.

Hypothesis 4. **Additional vulnerability dimensions.** *They are expected to affect negatively on awareness and on the registration processes for The Big Switch, compared to non-vulnerable groups*.

2.4. Econometric results

Table 3.3 presents the results of the econometric estimations, which include an exposure variable (the number of occupied households), and robust standard errors. Model (1) is the true counting model and model (2) is the zero-excess model. The last column (3) displays the marginal effects of the independent variables after the ZINB estimation, where the predicted number of households joining *The Big Switch* is 0.7495.

Table 3.3. Econometric estimations and marginal effects at the output area level. Zero-inflated negative binomial (ZINB) with a probit specification

Variable	True counting model (1)	Zero-excess model (2)	Marginal Effects (3)
Dissemination			
Internet penetration	0.0039***	-0.0223***	0.0049***
	(0.0010)	(0.0023)	(0.0006)
Percentage of households with someone offering unpaid care	0.0045***	-0.0105*	0.0043***
	(0.0014)	(0.0058)	(0.0009)
Information campaign (dummy)	0.0134	-0.0103	0.0110
	(0.226)	(0.0690)	(0.0148)
Vulnerability (Ofgem)			
Rural (dummy)	0.0795***	-0.2481***	0.0814***
	(0.0089)	(0.0487)	(0.0065)
Household average income (in thousands)	0.0235***	-0.0834***	0.0249***
	(0.0006)	(0.0039)	(0.0006)
Lowest income quartile (dummy)	-0.1091***	-0.2376***	-0.0615***
	(0.0186)	(0.0475)	(0.0116)
Percentage of households with someone aged 65over	0.0123***	-0.0009	0.0093***
	(0.0009)	(0.0043)	(0.0005)
Percentage of households with someone disabled	-0.0022**	0.0054	-0.00212***
	(0.0009)	(0.0034)	(0.0005)
Vulnerability (Additional)			
Percentage of highly deprived households	-0.0058***	0.0353***	-0.0075***
	(0.0018)	(0.0055)	(0.0011)
Percentage of households with lone parents	-0.0093***	0.0021	-0.0071***
	(0.0011)	(0.0034)	(0.0007)
Percentage of households with someone unemployed	-0.00007	-0.0124***	0.0010**
	(0.0008)	(0.0036)	(0.0005)
Percentage of Non-UK residents	0.0010**	0.0048**	0.0003
	(0.0004)	(0.0019)	(0.0002)
Percentage of households with	0.0119***	-0.1553***	0.0226***

shared accommodation	(0.0025)	(0.0406)	(0.0034)
Percentage of households with children	-0.0057***	0.0187***	-0.0059***
	(0.0006)	(0.0028)	(0.0004)
Energy related variables			
Percentage of households with no central heating	0.0080***	0.0049	0.0056***
	(0.0015)	(0.0055)	(0.0010)
Percentage of households with electric central heating	-0.0063***	-0.0224***	-0.0027***
	(0.0004)	(0.0045)	(0.0003)
Percentage of households with three or more rooms	0.0039***	0.0037***	0.0026***
	(0.0003)	(0.0013)	(0.0002)
Percentage of households owning their own homes	0.0094***	0.0141***	0.0058***
	(0.0005)	(0.0022)	(0.0003)
Constant	-6.6244***	2.2979***	
	(0.0923)	(0.2529)	

N=181,381 Log pseudolikelihood = -210429, Wald chi2(17) = 14221.07 Prob > chi2 = 0.0000
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

We start with the effects of the covariates that account for the way in which *The Big Switch* was disseminated. We find that the three variables have the expected sign in both the true-counting model and the excess-zero model (positive in model 1 and negative in model 2), although the dummy variable information campaign is not significant in any of them. [29]Both internet penetration and the prosociality index are significant at 1% level (except the prosociality index in the excess-zero model 2, which is significant at 10% level).

As hypothesized in Hypothesis 1, output areas with higher internet penetration and prosociality index have smaller probabilities that *The Big Switch* initiative went unnoticed among the households and have a larger number of registered households. The marginal effects are also positive and significant and of a similar same size, roughly speaking, an increase of 1% in one of the variables changes the counting in approx. 0.57% (0.0043/0.7495).

Result 1. *Internet penetration and membership to the organising institutions increase awareness and the number of registered households for The Big Switch. We find a positive but not statistically significant effect of the advertisement campaign on awareness and registration.*

[29] An alternative specification is to include dummy variables for each city that held an energy event. In this case, the dummies for Manchester and Reading are significant and with the expected sign.

We consider next the effect of the covariates associated to the vulnerability dimensions as defined by the UK regulator (hypotheses 2 and 3). Regarding the awareness process, we do find that none of the variables hinders the awareness of vulnerable groups of the collective switching initiative, as defined by the UK regulator.

Result 2. *None of the vulnerability dimensions as defined by the UK regulator impacts negatively on the awareness by vulnerable groups. On the contrary, rural output areas and those belonging to the lowest income quartile are significantly more aware of The Big Switch initiative.*

This results contrast with Hypothesis 2 and we believe that it is explained by a crucial difference between the empirical literature and the collective initiative that we are analysing in this paper. Typically, the empirical literature studies how behaviour changes as a result of the deregulation process. Now, the deregulation process is not publicized by any institution –maybe the deregulator but at a general level-, and in order to be aware of the existence of cheaper tariffs, consumers are required to play an active role in searching for the new information. And it is in this stage where empirical papers report that some vulnerable consumers remain significantly inactive compared to non-vulnerable ones, e.g. they remain unaware of better deals. But in the case that we analyse in this paper, there was no special requirement on the part of consumers to become aware of the initiative. This is because it was run at a national level and was highly publicized by the organising institutions, so any consumer was exposed, for example, to TV commercials and stands at local supermarkets.

However, when it comes to taking action, and this happens when consumers are required to register in the initiative, then our econometric model finds that some vulnerable consumers are significantly less active; in particular, those with disabilities and on low-income.

Result 3. *Disability and being on low-income make consumer less active in the registration process. However, rural output areas and areas with larger percentage of senior population register more for The Big Switch.*

There are two distinctive features from our results. The first one is that *rurality* does not hinder engagement, as found in the previous literature; quite on the contrary, rural output areas engage significantly more in the collective initiative and have more awareness. The marginal effect is positive and significant, 0.0814, implying that the increase in the number of rural households registering for *The Big Switch* compared to urban ones is around 10%.

The second one is that output areas with a larger presence of elder people are found to register more for the collective switching initiative, as the coefficient of the variable aged 65+ is positive (0.0123) and significant at the 1% level. The marginal effect is 0.0093, implying that a 1% increase in the share of households with members of age 65+ increases the registering around 1.23% (0.0093/0.7495).

Among the additional vulnerability dimensions, we can identify which variable are specially disengaged with the energy market. A variable is termed specially disengaged if it has a significant and positive coefficient in model 2 and a significant and negative in model 1. Two variables comply with this definition of extreme inactivity: highly deprived households and households with children. This result shows that there is a cumulative effect of vulnerability on disengagement, because our definition of highly deprived households is one that it is deprived in at least three of the following four dimensions: unemployment, low education, bad health and disability and housing overcrowding or no central heating. An increase in 1% in the share of highly deprived households reduces the registering for *The Big Switch* by 1% (measured by their marginal effects over the predicted number of registrations).

Overall, we do not find any significant effect for Non-UK residents (the marginal effect is not significant) and unemployment makes households to be more active in the energy market, because they are more aware of the collective initiative. Lastly, households with shared accommodation are more active in the TBS campaign, with both more awareness (negative and significant coefficient in model 2) and more registration rates (positive and significant coefficient in model 1).

Result 4. *We find two types of households that are extremely disengaged in the energy sector: those with children and highly deprived ones.*

Finally, we find that output areas with larger proportion of large houses (with three or more rooms) or without central heating or with those living in their own homes have positive and significant marginal effects, mainly because they are more active once they are aware of the TBS campaign. However, households with electric central heating are more inactive, as they have a significant and negative marginal effect.

Result 5. *Households on rented accommodation and with electric central heating are more inactive in the energy market.*

2.5. Policy Implications and conclusions

Efforts to reduce fuel poverty are at the center of the policy action in many countries (UK, Ireland, EU and New Zealand among others) since the economic downturn in

2007. There are many definitions of fuel poverty –and different countries may focus on different definitions, see Section 2- but regardless of the particular definition that policy makers favour, it is a general principle that (1) an increase in households income or (2) investment in more efficient housing or (3) a reduction of energy prices will help to alleviate fuel poverty.

Policies (1) and (2) are very demanding from an administrative point of view because they are directed policies and its implementation requires an efficient process able to identify households in fuel poverty. Policy (3) imposes less burden on administrative units because they operate on market conditions, aimed at lowering prices that will benefit all consumers, including vulnerable ones. This is why deregulation of energy markets was a popular policy in developing countries and in developed ones (see references in Section 3).

However, promoting competition in energy markets via deregulation has one major drawback: it requires *consumer engagement*; otherwise, companies will not feel the competitive pressure. Consumer engagement requires two active steps from consumers: first, awareness –being aware that cheaper tariffs are available in the market- and taking action – and second, switching after acquiring the information.

Compulsory information provision by energy suppliers and the promotion of price comparison websites are popular policy measures aimed at reducing search costs and increasing awareness (see for example Dobbins et al, 2015), but there are other barriers that prevent consumers from using them: behavioural (and cognitive) barriers. However, there is evidence that these barriers clearly affect vulnerable consumers (see for example Allcott and Mullainathan, 2010 and Atasoy and Madlener, 2020), reducing the efficacy of these measures for tackling fuel poverty in vulnerable consumers.

What are we left with from a policy point of view? Literature highlights the role of civic society groups and other non-governmental organisations in assisting energy poor through interventions (see for example Lorenç et al, 2013). But this type of actions is very demanding, as it requires deep knowledge of which vulnerable households are fuel poor and is necessarily limited to a small number of households, as interventions requires repeated visits to households by dedicated personnel.

Our work has identified a policy measure that can help: the promotion of collective switching initiatives. The reason is that the promotion campaign is a public good that deployed in the right places, – for example shopping centers or TV commercials- can easily reach all consumers, including the vulnerable ones. We find that *The Big Switch* raised awareness of all vulnerable consumers (as defined by Ofgem). The big promotion campaign is what explains why some vulnerability dimensions that had

been previously associated to less awareness (aged 65+ and rural) in the literature, have a positive impact in the case of *The Big Switch*.[30]

Of course, many of the results that we have identified in this paper will depend on the specific features of *The Big Switch*. One might be for example that the initiative was organised by a consumer association (*Which?*) and a campaigning organization (38 degrees) and that all their members received information about it through private channels (emails and magazines). From the point of view of the success of the initiative, this is good news, because it will increase awareness and this is what we find in the data. It is interesting to link this to a possible *in-group effect*: an initiative run by an organization is likely to be supported by their members. This effect will reinforce the success of the initiative, because by increasing consumer registration, the potential energy providers will end up offering better deals in the auction.

Even when awareness clearly raised, registration required taking action on the part of consumers, and in this step, *The Big Switch* suffered, like any other policy measure would have, when trying to mobilize vulnerable consumers. We have found that two types of vulnerable households were particularly inactive: those with children and highly deprived ones. Hence, this result shows a cumulative effect of vulnerability and identifies households with children as extremely vulnerable. And it is here where the efforts from a policy point of view would had been placed, had there been any vulnerability concerns in the collective switching.

[30] This is more striking when one realizes that the Big Switch was not designed to address any vulnerability dimension at all.

Chapter 3. Benefits Of Policy Actor Embeddedness For Sustainable Tourism Indicators' Design: The Case Of Andalusia[31]

3.1 Introduction

Tourism has become one of the fastest growing industries in recent years and was declared one of the world's most important economic sectors in 2019 (OECD, 2020). Researchers pointed out that the steady increase in tourism activities was generating challenges in terms of this accelerated development compatible with sustainable business models (Butler, 1999).

The severe drop in tourism activities after COVID-19 pandemic exposed the industry to this envisaged risk, with serious implications for tourism destinations and their expected economic, social and environmental impacts (Gallego & Font, 2020). In this context, the development of tourism strategies and policies based on sustainability principles has become an even more prominent policy issue in tourism (UNWTO, 2020).

Tourism activities have important effects on economies, the environment and societies. To ensure effective tourism management, governments need tools for measuring these impacts, so tourism destination managers need to create organisational structures that exploit the available data and produce, manage and integrate information more effectively (Gretzel et al., 2015; UNWTO, 2020).

Implementing sustainable tourism requires tailored and effective governance (Bramwell & Lane, 2011) to ensure the successful implementation of the monitoring processes and that stakeholders accept the results (Hall, 2009). The objective of the present research is to integrate the territorial governance perspective into tourism sustainability measurement and to examine the ways that the policy actors influenced the design and implementation of a system of indicators for sustainable management of tourism. The methodology used is a case study of the development of a system for measuring tourism sustainability implemented in Andalusia (Spain) that has allow us to answer the following research questions:

Research Question 1: What are the challenges faced for policy actors' integration in the process of creation of a system of indicators as a tool to measure tourism activities' impacts on sustainable development?

Research Question 2: What are the benefits obtained from this integration?

Research Question 3: What are the shortages of this integration?

[31] The content of this chapter has been published in the *Journal of Sustainable Tourism*, (Moniche and Gallego, 2021)

The rest of this chapter is structured as follows. Section two includes the theoretical underpinning of the research. Section three describes the methodology used and provides a general description of the development of a system for measuring tourism sustainability implemented in Andalusia (Spain) as a case study. Section four presents the different stages' main results during this system's creation and the ways policy actors' requirements were integrated. The paper ends with a discussion of the findings and conclusions in section five.

3.2 Institutional approach and governance dimension.

The initial developments of institutional theory studied what makes organisations similar (DiMaggio & Powell, 1983) by understanding how these structures and patterns of behaviour became stable. Over time, an organisation would create routines, shared values and accepted patterns of behaviour that would mean it was more institutionalized.

More recent developments in institutional studies try to explain how stable structures and patterns of behaviour change. New institutionalism has shown that entities generally seem to respond to environmental shifts in similar ways. The policy problem posed by sustainability has arisen as an environmental shift altering institutional arrangement and policy implementation at international, national and local level (David & Bitektine, 2009).

This process, known as deinstitutionalisation, is not only triggered by environmental shifts, actors within organisations can also play a role in creating and modifying institutions (Lawrence & Suddaby, 2006).

The role of actors within their organisations is important in the shift of current research from a traditional focus on gathering data from outside the organisations in question towards an interpretation of the processes from within these entities. Suddaby (2010) argues that this approach allows researchers to understand more fully how organisational meaning systems are understood and interpreted within organisations.

Institutional theory has previously been applied to tourism organisations in both the private (De Grosbois, 2016) and public (Estol et al., 2018) sectors. Hall (2011) analyses sustainable tourism, and its governance systems, via the concepts of policy learning and failure, rather than from the basis of institutional theory. However, the same author also identifies the role of actors within organisations in exerting changes in institutional arrangement. The policy problem of sustainability in tourism, is a sub-set of the broader policy arena with its own specific set of institutions and policy actors at various levels (Hall, 2011).

Governments, as tourism institutions, can use indicators as instruments to influence the sustainability of tourism. Various initiatives, official agendas and proposals have focused on defining sustainable tourism and providing tools for its assessment (Niavis et al., 2019). For example, the UNWTO's (2016) *Statistical Framework for Measuring Sustainable Tourism* concentrates on economic, social and environmental statistics. The same organisation's International Network of Sustainable Tourism Observatories initiative, in turn, delineates general areas that need to be monitored everywhere. The European Tourism Indicator System (ETIS) initiative (European Commission, 2016) was further endorsed by the European Commission.

Academic studies of sustainability measurement have proliferated in recent years, but these efforts have frequently been disconnected from government policies (Holman, 2009). Tourism research acknowledges the important benefits of participative approaches (Damian et al., 2021), considered as key for the promotion of sustainable tourism (Roxas et al., 2020).

Many studies agree on the difficulty of reaching a consensus between the scientific-academic focus and the needs of policy actors for the creation of Sustainable Tourism Indicators (STIs) (Torres-Delgado et al., 2021; Tanguay et al., 2013; Rametsteiner et al., 2010; Holman, 2009). Relevant sets of indicators proposed by academics can be too complex to be adopted by policy-makers who very often lack this type of technical and scientific knowledge (Modica et al., 2018). At the same time, sets of indicators created from a participatory approach are at risk of being determined and exploited for territorial branding purposes (Tanguay et al., 2013).

Singh et al. (2009, p.192) propose the 'top-down' and the 'bottom-up' approach for defining and developing STIs. The 'top-down' approach uses the opinion of experts and researchers to design the framework and selection process. The 'bottom-up' approach involves different stakeholders in the method creation, in order to define priorities and to understand and engage with multiple perspectives (Pain, 2004). This approach combines the existence of core indicators with specific ones that can integrate individual sustainability and governance issues of each destination (Biermann et al., 2017). Policy actors have a role to play in identifying STIs pertinent to destinations (Rasoolimanesh et al., 2020).

Rasoolimanesh et al. (2020) identify that governments, local businesses, and residents are acknowledged as key stakeholders in numerous STIs studies. The same author highlights that, while tourism indicators related to the economic, social and environmental dimensions of sustainable development have been widely studied, the governance dimension has received little attention.

The implementation of a system of indicators for the sustainability of the tourism sector in Andalucia offers the opportunity to apply the institutional theory in the tourism public sector. This context is used to understand how stable structures and

patterns of behavior change using indicators as instruments to respond to sustainability policy problem. In this framework, actors within their own organization played a role, hence, we study a process of deinstitutionalization to get insights on how actors within tourism management organizations can shape institutions. In this research, we advance in the governance dimension, which has received little attention, but the context did not offer the opportunity to advance in the participation of local businesses and residents.

This research offers the knowledge of an experience where there is a mixture between the 'top-down' and the 'bottom-up' approach that will serve as a reference for other entities (e.g. tourism destinations) working on measuring system development with practical applications as well as for academia to integrate policy actors' needs into theoretical approaches.

3.3 Materials and methods

Overview

Case study research, as compared to experimental studies, investigate specific cases in their natural context and examine real-world settings (Yin, 2014). The present study adopted a descriptive approach to mapping the Andalusia System of Sustainable Tourism Development Indicators (SISTA) development, analysing the progression of events over a specific period and describing the system's different characteristics within its distinct context (Gerring, 2004). This methodology provided an inclusive framework for systematically studying and describing SISTA's definition and implementation.

Case studies are extensively used in measurement of tourism sustainability research, (Twining-Ward & Butler, 2002; Hezri, 2004; Blancas et al., 2010; Tudorache et al., 2017; Cabello et al., 2018; Torres-Delgado & Palomeque, 2018; Modica et al., 2018; Damian et al., 2021). Various aspects of previous case studies indicated this methodology was a valid research tool for the present study (Beeton, 2005), based on: (1) this method can highlight situations' complexities by identifying more than one contributing factor, (2) case studies can also reveal personalities and policies' influence on issues and (3) this approach can shed light on generalised problems by examining specific instances.

The present study analysed how the SISTA accounting system was developed, among other real-world aspects. The research focused on the specific period in which the system was implemented at the beginning of its mandate period (i.e. 2016–2020) and on the region for which the SISTA was created (i.e. Andalusia).

To answer the research questions, the case study identified the sequence of phases and activities leading to the SISTA's creation and examined the policy actors' role in and influence on each step of the process. The research traced the SISTA's evolution from a theoretical measurement system into a real-world exercise. The findings offer a wider perspective on how to investigate and describe the perceived benefits of policy actors' involvement in sustainable tourism measurement. The main goal, therefore, was to expand and generalise theories (i.e. analytical generalisation) rather than to extrapolate probabilities (i.e. statistical generalisation) (Yin, 2014).

The current case study was carried out in the tourism destination of Andalusia, a Spanish region with 88 thousand square kilometres and a population of 8 million residents. Various factors functioned as catalysts of the decision to create a system to evaluate sustainability policies. The first factor was tourism's great importance to Andalusia's economy. In 2019, this region received a total of 12.4 million international tourists, and the tourism sector accounted for 13% of Andalusia's gross domestic product (Junta de Andalucia, 2019). The second factor was the regional government's increased production of statistics, ensuring Andalusia can generate its own statistics for tourism and other highly complex economic sectors. The last factor was that full powers were delegated to the region regarding tourism strategies, which favoured the development of organisations and tools to manage and monitor tourism.

Andalusia thus started to define a new general plan for the 2016–2020 period. One of the government's goals was to develop a monitoring tool that could track policy actions' short-term and medium-term results. As early as 2012, the regional government's tourism division was already working on evaluating policies and creating a system of indicators to facilitate an integrated approach to this tourism destination's complex realities and drive towards sustainability. A document was eventually drawn up called the *General Plan for Sustainable Tourism of Andalusia, Horizon 2020* (Junta de Andalucia, 2016b).

Using Andalusia as a case study of an indicator system's development and application thus makes sense for various reasons. This region is a top tourism destination, tourism is an important sector in its economy, the region produces reliable statistical data and it has full powers in terms of creating tourism policies. These characteristics make this research context appropriate for an examination of a system of indicators' design and application. The following subsection describes the process of defining the system.

SISTA working group (SISTA-WG)

The SISTA was developed by an interdisciplinary group of 15 experts selected by a snowball selection process that was initiated by two of them: one from academia and the other from the Tourism Regional Government. Priority was given to

including individuals with relevant background and valuable information with respect to the purpose of the project (Damian et al., 2021), such as previous experience in tourism-related research and projects, especially sustainable tourism and knowledge about the Andalusian tourism sector's realities and specificities. Andalusian experts had already carried out many tourism-related academic studies, and the regional governments' tourism organisations had permanent staff with extensive experience in gathering statistics and planning. The region's numerous highly qualified experts thus facilitated the selection of academic specialists based in Andalusia.

The team's expertise included economics, geography, graphic design, information technology, marketing, applied mathematics and statistics (see Table 3.1). This project's most distinctive feature was policy actors' incorporation from the beginning. These actors were three economists who held elected positions in the region's tourism administration and who were responsible for tourism planning while in office.

SISTA creation was a process of dialogue and consensus between indicator creators and policy actors within SISTA-WG. However, other relevant actors, such as residents or the private sector, just participated in the validation of SISTA following the enabling procedures designed to foster private sector and residents participation in the tourism planning system (Junta de Andalucía, 2016e). This participation was promoted by organising forums, gatherings and meetings, both online and offline, fostering a process of shared reflection, dialogue and codecision to identify challenges, search for solutions and their management and its implementation in the planning tool, including the mechanisms designed for their measurement and monitoring (SISTA).

Table 3.1. SISTA-WG composition.

Area of expertise	Number of people	Regional government/academia
Economics	3	Regional government policy actors
Geography	1	Academia
Graphic design	1	Regional government officials
Information technology	4	Academia
Marketing	1	Academia
Applied mathematics	2	Academia
Statistics	3	Regional government officials

The objective was to avoid mistakes such as a limited understanding of tourism-related systems and an overly simplistic indicator system or one so complex that end users have to have a high level of expertise. Another problem a heterogenous group could avoid was poorly adapted theoretical models or those unsupported by recent statistical trends.

The teamwork was based on group decision making (GDM), in which members interacted multiple times before any final decision was reached. Firstly, all team members were aware of basic information, related research and relevant international guidelines and recommendations (United Nations Statistical Division, 2010), and of the draft of the *General Plan for Sustainable Tourism of Andalusia, Horizon 2020* (Junta de Andalucía, 2016b). Each member approached the decision process from a different perspective, but they shared a common interest in reaching an agreement about the best options (Roubens, 1997).

The GDM involved two different processes. The moderator first guided the team as they identified their main ideas about solutions for the decision problem, after which the GDM moved on to forming a consensus around a single solution (Cabrerizo et al., 2010). For the SISTA-WG, this selection process comprised a dynamic, iterative exercise coordinated by a moderator (i.e. one of the authors of this paper) who paid attention to the level of consensus and who was in charge of stimulating the maximum agreement possible. The general expectation was that the group would seek to reach the maximum level of agreement before the selection process began. The group meetings then focused on reducing the number of members who disagreed in each iteration (Cabrerizo et al., 2010).

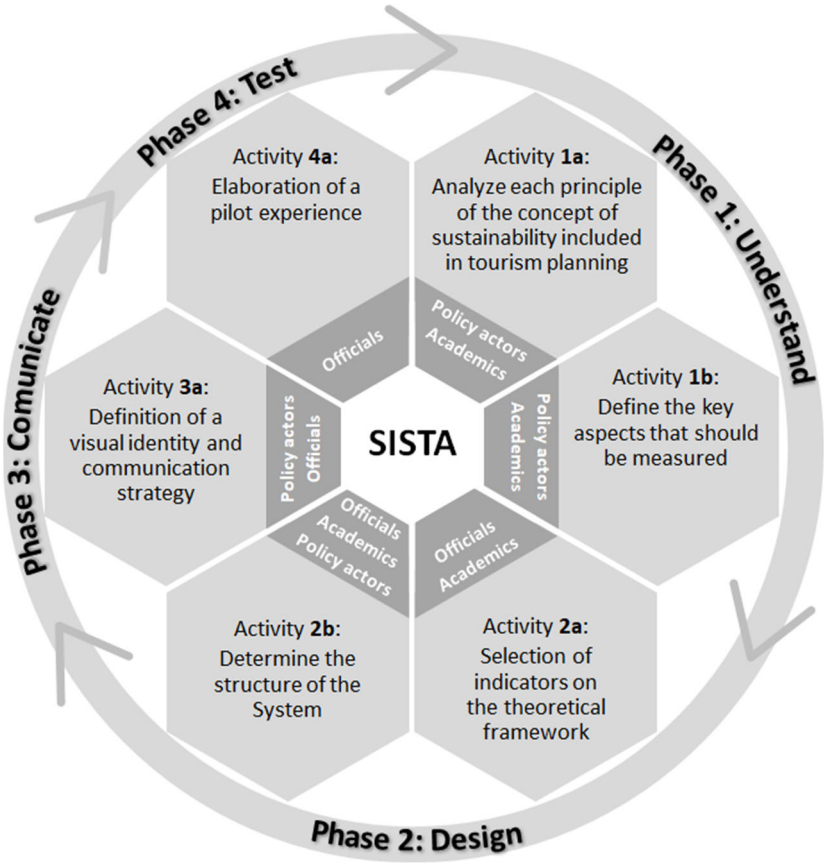
During the eight meetings held, the members expressed, discussed and adjusted their preferences to reach a final consensus with an acceptable level of agreement (i.e. at least three-quarters of the experts accepted the idea as the best solution). Each individual's preferences were integrated into the selection process to construct a collective solution. At the end of each round of interactions, the members were informed about how far from or close to reaching a consensus the team was. They were also told which were the most controversial topics and different preferences related to topics generating more disagreement (Pérez et al., 2013).

Methodological phases

The SISTA-WG's work was based on creative collaboration with policy actors, whose participation started with the first stages of the SISTA design process. This approach allowed the team to take advantage of these actors' experience, pay attention to their needs and formulate a proposal for how decision makers could measure sustainability. The methodology thus involved a multidisciplinary, iterative, incremental and reflective process in four phases, each with their own objective:

understand, design, communicate and test. Figure 3.1 shows the workflow, the activities in each phase and the actors involved.

Figure 3.1 Workflow, activities, and actors for SISTA development



The 15 experts in the SISTA-WG worked through the first three phases over one year (June 2012–June 2013). The last phase involved only the regional government officials on the team – including both authors of this paper – in the following year (September 2013–September 2014). This subgroup was put in charge of the system's subsequent on-going maintenance, but they shared the final results with the rest of the members and adjustments were agreed upon by following the GDM procedure.

The policy actors present the need of a monitoring and diagnostic tool to guide sustainable tourism policies at the beginning of the planning process, and the entire team made a clear commitment to this goal. This practical focus was a critical element in the resulting performance measurement system's success (Franceschini et al., 2007).

During the first phase (i.e. understand), the SISTA-WG completed two activities. In the initial step (i.e. Activity 1a), the group defined the concept of sustainability, which served as a theoretical framework during the drafting of the planning document *General Plan for Sustainable Tourism of Andalusia, Horizon 2020* (Junta de Andalucía, 2016b). Sustainability was defined based on an integration of six main principles.

First, sustainability defends local resources (e.g. natural, cultural, ethnographic and landscape) because they shape the various forms that tourism activities can take. Second, sustainability efficiently and fairly produces tourism services, which must promote the business ecosystem's development to ensure companies that offer tourism products are profitable and competitive. A particular emphasis was placed on tourism-related jobs' stability and quality.

Third, sustainability entails governance based on transparency, participation and joint decision making, in which subsidiarity and public-private and public-public cooperation characterise decisions. Fourth, sustainability strengthens regional cohesion so that tourism activities contribute to a balanced territorial development across Andalusia. Fifth, sustainability appropriates tourism activities' social value for local residents. Last, sustainability fosters continuous investigation, development and innovation.

This definition of sustainability is fully compatible with the UNWTO's (2013:10) assertion that sustainable 'tourism . . . takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities'. The SISTA-WG's conceptualisation process integrated both the basic sustainability dimensions defined by the UNWTO (2013) (i.e. economic, social and environmental) and a broader, more detailed approach. This definition requires policy actors to foster a strong link between the theoretical concept of sustainability and their tourism-planning framework. To this end, Activity 1b required the SISTA-WG to analyse each sustainability principle and define the key aspects that need to be measured.

Next, the group moved on to phase two (i.e. design), which included two activities. In Activity 2a, the members selected indicators to measure the identified aspects of sustainable tourism, while, in Activity 2b, the team organised the information collected and agreed on at that time. Before selecting the indicators, the SISTA-WG decided that Andalusia's particularities legitimised the development of specific regional indicators (Sharpley, 2000; Tanguay et al., 2013).

Measuring sustainability's dimensions and taking into account Andalusia's specificities required multiple indicators, but a practical, flexible and operational model could not contain an excessive number of measures. The existing literature

shows that the optimal number of indicators is still open to debate because it depends on the complexity of the concept to be measured and the degree to which each indicator covers the different aspects of the concept to be measured (Gallego & Font, 2019). The number of indicators can be reduced if the system developers have more exact information on the concept in question, but, if this is not the case, two or more indicators need to be combined.

The SISTA-WG, from the beginning, was concerned about the system of indicators' chances of surviving the planning process because collecting the data needed not only to test the indicators' definition but also to calculate values over the time can be expensive. Repeated measurements' cost-effectiveness and viability, according to Hezri (2004), are two of the longevity criteria for tools assessing sustainability and, more specifically, for indicators. Policy actors have traditionally dealt with this issue by insisting on a positive relationship between the cost and the data's volume, quality and utility.

Information is often not systematically kept, and data often lack the continuity needed for trend analysis. Sometimes data-gathering methodologies change, which complicates data interpretation and uniformity (Hezri, 2004). To deal with these problems, the SISTA-WG decided that, whenever possible, indicators should rely on data from official organisations that produce statistics that are usually safe from these threats. The statistics must also offer many other advantages such as harmonised definitions and methodologies (United Nations, 2014). The proposed standards-based framework had previously been shown to enhance the credibility, comparability and outreach of various measurement and monitoring programmes related to sustainable tourism (UNWTO, 2016).

Once the system and its indicators' structure were completed, the SISTA-WG started phase three (i.e. communicate), which focused on defining the most appropriate visual identity and communication strategy, including a user-friendly visualisation of results (i.e. Activity 3a). The group had decided not to limit the number of indicators, but the policy actors felt that the quantity of information collected by the indicator system could diminish the findings' usefulness during decision-making processes. The data thus had to be presented in a concise, holistic way to support decision makers (Gallego & Font, 2019).

Composite indicators are a practical solution when indicators collect a large quantity of information, which can make using this information in decision making difficult. The data need to be presented concisely and holistically in order to support decision makers (Gallego & Font, 2019).

The indicator aggregation method must satisfy practical considerations and consider the indicators' intended purpose (Lozano-Oyola et al., 2019). It must

facilitate communication with and interpretation by any user but also allow policy actors to deal with different scenarios. The latter can range from weak sustainability, in which poor results in one sustainability dimension can be counterbalanced by better results in different dimensions, to strong sustainability, which does not contemplate any compensation between indicators. The latter always involves the worst possible values, and hence, the worst possible sustainability scenario. Between both extremes, users can find mixed scenarios with different levels of possible compensation.

Most studies using composite indicators to measure tourism-related sustainability have opted for the equal weight approach (Blancas et al., 2010; Castellani & Sala, 2012; Torres-Delgado & Palomeque, 2018; Twining-Ward & Butler, 2002). This choice has been made mainly due to a lack of previous experience or consensus on which factors make tourism destinations more or less sustainable.

The SISTA, therefore, uses composite indicators and focuses on the target audience's needs through a user-friendly interface design with elements that end users feel are easy to interpret and understand, which are important features of this tool. These types of instruments must be able to provide an overall assessment of sustainable tourism development that can be quickly deciphered by and communicated to the intended target audience. Miola and Schiltz (2019) report that these are key components of successful performance assessment tools.

The design and communicate stages ensured that the SISTA's methodology includes significant features of other indicator systems (Franceschini et al., 2007; Kitchin et al., 2015; Newton, 2001). The selected indicators aimed to diagnose problems' causes, measure potential solutions' impact and assess whether tourism activities are becoming more sustainable or whether their sustainability has reached a designated threshold or target. In addition, the proposed system aimed at providing feedback loops to identify gaps between performance and expectations, formulate new interventions and set fresh absolute or relative targets and goals. These are the expected results of any system of indicators, however there exists some barriers when they are implemented (Torres-Delgado et al., 2021). These barriers became evident in the last phase, when the SISTA-WG decided to test the system using real data. Phase four (i.e. test) thus included a pilot test to confirm the SISTA's feasibility and collect feedback from the officials who made the calculations and policy actors, in general, as end users (i.e. Activity 4a). To this end, the team's regional government officials created a minimally viable product and a prototype activity to test whether the SISTA fulfils different relevant stakeholders' requirements (Baldassarre et al., 2017).

The results led the SISTA-WG to reconsider the system's balance between desirability, feasibility, viability and sustainability (Baldassarre et al., 2020) and

evaluate the coverage achieved with the information sources available at that time. The group further searched for possible solutions to address those aspects inadequately covered, as well as testing the system's usability in terms of policy actors' decision-making activities. This phase ended with the presentation of SISTA to other stakeholders, private companies and residents, validating it through meetings, public consultations, and collaborative spaces required by the legal process of defining the planning framework of the Region.

Policy actors' participation was thus essential to the SISTA's conceptual development (i.e. phase one's Activity 1a and 1b), information organisation and final structure (i.e. phase two's Activity 2b). These actors additionally played a critical role in ensuring the resulting information was presented in a user-friendly format that made correct interpretations more likely, as these actors are, ultimately, the system's final users (i.e. phase three's Activity 3a). The following section presents in greater detail the requirements introduced by the participating policy actors and the solutions the group chose to integrate into the SISTA in response to these needs.

3.4 Decisions and results

During the first phase (i.e. understand), the SISTA team had to identify the sustainability dimensions to be defined based on the regional government's existing overall plan. To meet this objective, the SISTA-WG conducted three levels of analysis. The first defined the key areas that comprise a holistic vision of Andalusia as a tourism destination. The second level of analysis isolated key themes within the previously defined key areas. At the third level, individual simple indicators were formulated.

For the sake of constructing a practical system, able to comprehend the sustainability paradigm as defined in the plan, but with a practical coherence and applicability, the seven key areas defined are governance, territory, vulnerability, profitability, diversification, quality and technology. The governance area assesses the government's ability to create networks that foster collaboration among stakeholders. It includes indicators on the degree of collaboration among stakeholders and on the residents' and private actors' assessment of tourism policies and administrative processes' efficiency.

The area of territory evaluates regional cohesion, human pressures, environmental quality, environmental protection, natural resource usage, transport, housing and environmental awareness. The Vulnerability area involves monitoring the degree to which the Andalusian tourism sector is susceptible to environmental, economic or social stress. While this area is usually assessed primarily in terms of the natural environment or disasters, vulnerability also applies in the present context to economic and social sustainability.

Profitability as a key area covers measuring tourism as an economic sector, including income and employment generation and the multiplier effect. Diversification, in turn, requires evaluations of the available resources that can become tourism assets. Quality can be measured in the destination as a whole or its specific resources (e.g. beaches, natural areas and cultural heritage), infrastructure and the accommodation and restaurant subsectors. Finally, technology comprises evaluations of the degree to which information and communications technology has permeated the entire tourism sector.

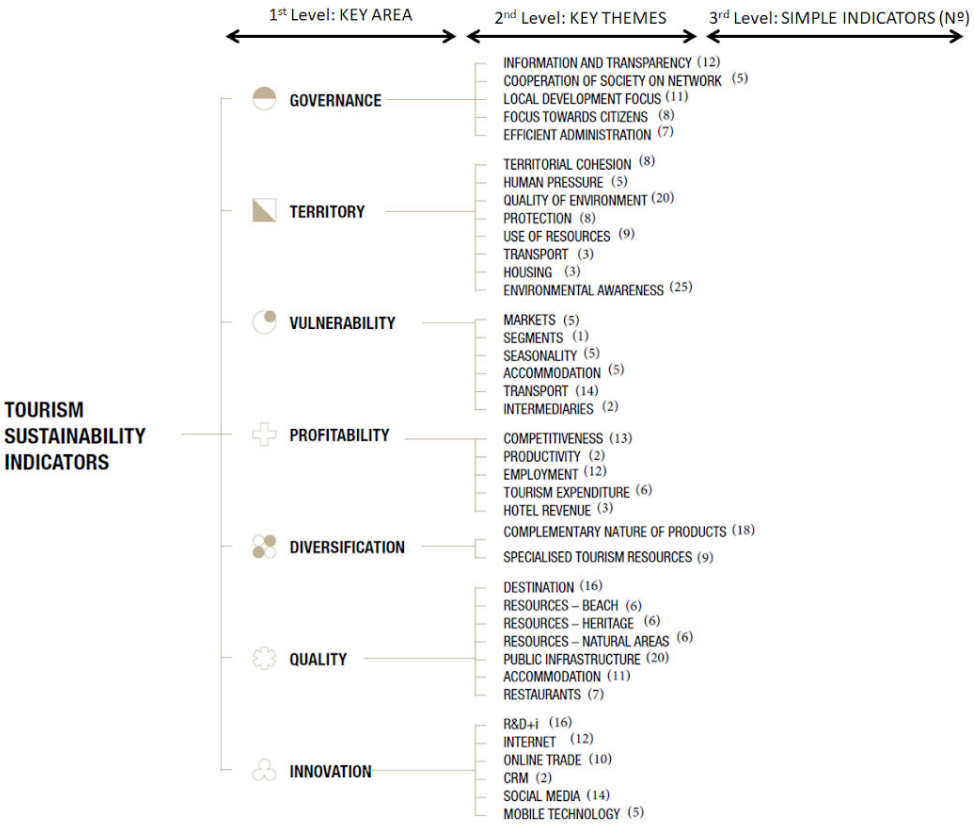
Table 3.2 Sustainability principles and key areas

Sustainability principles	Key areas
1. Defend local resources (e.g. natural, cultural, ethnographic and landscape) because they shape the various forms that tourism activities can take.	Governance
	Territory
	Diversification
	Quality
2. Efficient and fair production of tourism services, which must promote the business ecosystem's development to ensure companies that offer tourism products are profitable and competitive. A particular emphasis was placed on tourism-related jobs' stability and quality.	Vulnerability
	Profitability
	Diversification
3. Governance based on transparency, participation and joint decision making, in which subsidiarity and public-private and public-public cooperation characterise decisions.	Governance
4. Strength of regional cohesion so that tourism activities contribute to a balanced territorial development across Andalusia.	Territory
5. Appropriation of tourism activities' social value for local residents.	Governance
	Territory
	Profitability
6. Foster of continuous investigation, development and innovation.	Innovation

This level of analysis did not seek to create a direct correspondence between these 7 key areas with the 6 sustainability principles incorporated into the conceptual framework of the regional government's tourism-related plans (Junta de Andalucía, 2016b; 2016d). The equivalence with the 6 principles of sustainability definition could, a priori, not seem straightforward, but all 6 principles have a correspondence with 7 key areas in the SISTA (Table 3.2), where the selected key themes and indicators were organised with a practical vocation.

The resulting approach would have been overly restrictive. Instead, the SISTA-WG focused on defining a final set of indicators for the principles forming the three fundamental pillars of tourism sustainability (i.e. economic, environmental and social) defined by international organisations (European Commission, 2016; UNWTO, 2016). The seven key areas are thus a core finding of the SISTA-WG, and have been integrated into Andalusia's tourism policy.

Figure 3.2 SISTA's structure with key areas and themes defined



Note: Number of simple indicators shown in parentheses.
Source: Authors, based on Junta de Andalucía (2016d)

The second phase (i.e. design) concentrated on structuring the system and selecting indicators based on the planning document's theoretical framework (Junta de Andalucía, 2016b). Figure 3.2 presents the SISTA's structure including the key areas and themes defined. Given the large number of simple indicators (i.e. 348) included in the system, they cannot all be shown in this figure. The number of indicators is

given in parentheses for each key theme. A detailed description of every indicator can be found in the final document's bilingual Spanish-English version: *Sustainable Tourism Development Indicator System for Andalusia* (Junta de Andalucía, 2016d).

The SISTA-WG ultimately defined the 348 simple indicators that addressed the policy actors' requirements, interpreting tourism's complex realities and integrating sustainability's multiple dimensions as defined in the government's plans. The group understood that the system's application to practice is dependent on finding the necessary data to calculate the indicators' values (Lozano-Oyola et al., 2019; Torres-Delgado & Palomeque, 2018), so the final results include recommended official data sources.

Andalusia's increased generation of multiple statistics ensures the availability of regional data on tourism and other economic sectors, which enhances the indicator system's feasibility and ensures its continuity. A lack of data has been identified as one of the main obstacles to implementing this type of system (Interreg Mediterranean et al., 2019; Tudorache et al., 2017). The data available on tourism and other sectors allowed the SISTA-WG to adopt a broader definition of sustainability that requires a combination of extremely diverse information.

In addition, the system's reliance on official data further helped the team overcome budgetary constraints, which the policy actors identified as a concern. Practical implementation constraints were encountered throughout the entire SISTA design process. Budgetary restrictions were discussed from the start given that collecting data can be expensive, which affected not only the first steps in defining and testing the SISTA but also its chances of survival during the entire planning process and in the long term. Hezri (2004) includes cost effectiveness and a capacity to repeat measurements as longevity criteria for tools that assess sustainability and development indicators.

During the design process, human resource capacity was also identified as a technical issue that constrains sustainability measurement (Hezri, 2004; Kitchin et al., 2015). In the SISTA-WG's case, human resource capacity was initially one of the project's main strengths. However, to monitor sustainability planning's impacts, officials must find a balance between completing immediate administrative tasks and satisfying the demands of more research-oriented or long-term activities. While the necessary human resources existed for the SISTA project, the regional government officials involved were also often required to fulfil other more on-the-ground practical obligations (Hezri, 2004). Thus, policy actors have to find a balance between daily and SISTA-related tasks to ensure human resource capacity, which hinders medium- and long-term efforts to update and maintain the SISTA.

Human resources allow policy actors to conduct annual measurements in order to monitor the progress made towards sustainability, but work schedule limitations can affect timely information's regular production with minimal delays. The latter is usually required to gain insights into how to change present practices in order to ensure the desired future outcomes (Kitchin et al., 2015). In addition, tourism contexts' dynamics make identifying correlations between past and future results more difficult. The more dynamic a context is, the more crucial information's timeliness becomes (Shankaranarayan et al., 2003). Policy actors must ensure that balanced financial and personnel resources are available to maintain tools ability to measure sustainability.

Another key finding during the SISTA process came from the policy actors' requirement that the system generate uncomplicated information yet that the number of sustainability areas, themes and indicators not be artificially limited. In the third phase (i.e. communicate), the SISTA-WG identified two solutions that could satisfy these two conditions. First, the model was simplified by incorporating a policy formulation approach that condenses the initially available data and by using composite indicators. Second, the indicator system offers end users a user-friendly, intuitive interface to present results.

Policymakers recognise that composite indicators are a standard approach that facilitates political decisions, but the information has to be simplified to ensure the public understands indicator systems' findings (Tanguay et al., 2013).

With respect to policy actors' preference on weak or strong sustainability, it was the mixed-scenario solution because it provides a more flexible tool that simulates different tourism policy alternatives. This adjustable approach led the group to adopt a multiple-criteria, double-point method, which has been previously applied to measure sustainability (Cabello et al., 2018). In tourism, this method has been specifically used to measure sustainable limits to tourism destinations' growth (Jurado et al., 2012) and to analyse tourism destinations' vulnerability to airlines' commercial decisions (Gallego & Font, 2019).

The SISTA's unique contribution to the weighting system, is one based on the system's three-level structure, starting with adjusting each individual indicator's weight within the relevant key theme. The other components are estimating each key theme's weight within the appropriate key area and each key area's weight in the overall composite sustainability indicator.

Composite indicators' development involves different stages (Nardo et al., 2005; OECD, 2008). In the present process, weight assignment was an important step that required the active participation of varied stakeholders in Andalusian tourism. The 348 individual indicators were weighted by the officials in the SISTA-WG, who

would actually do the calculations, based on the suitability and availability of the information needed to measure sustainability levels correctly. Both direct or indirect and partial or complete measurements were considered.

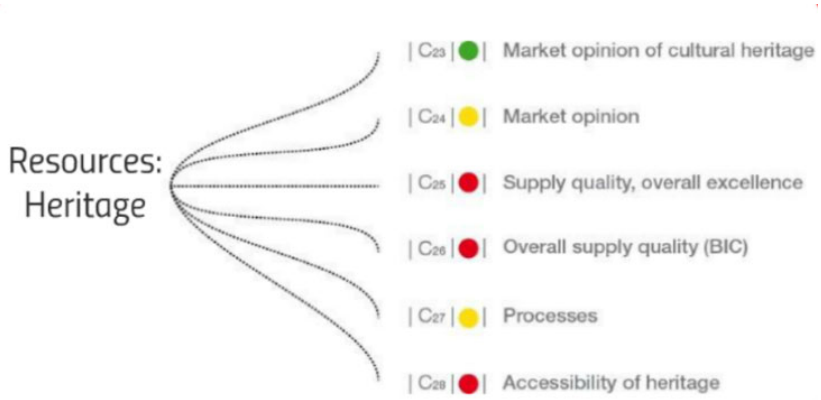
In some cases, indicators are indirect because the phenomenon in question is intangible or it cannot be directly observed (Kitchin et al., 2015). For example, the number of second houses can be used as a proxy for rented private accommodations. In some cases, generating new data was overly costly, so the SISTA-WG included surrogate variables from pre-existing datasets. For instance, many indicators were calculated using hotel surveys even though the indicators cover the entire accommodations sector. Depending on each indicator's ability to capture to the final sustainability concept, each indicator was given a weight on a Likert scale (i.e. 1 = Indirect, partial indicator; 2 = Direct, but partial indicator or indirect, but complete indicator; 3 = Direct, complete indicator).

The key themes were further weighted by 90 tourism experts from outside the SISTA-WG, who have specific knowledge about Andalusia as a tourism destination, via an online survey. These specialists assigned a value to each key theme based on how important it is to evaluations of the relevant key area within Andalusia tourism, also using a Likert scale (i.e. 0 = Not important; 1 = Only slightly important; 2 = Somewhat important; 3 = Important; 4 = Very important; 5 = Extremely important). This survey was not a theory-based evaluation that could fit any destination but instead an applied assessment of Andalusia's particularities.

Finally, the SISTA-WG's policy actors defined the key areas' weights to incorporate their perceptions of each area's significance to tourism policies and future planning processes. A three-point Likert scale was used (i.e. 1 = Little importance; 2 = Medium importance; 3 = Great importance). Other policymakers outside the SISTA-WG also played a key role in defining the key areas' relative significance when the composite index was finalised (Freudenberg, 2003; OECD, 2008).

Another important contribution of the SISTA team was to make complex information digestible to a lay audience using a universal colour code based on the traffic light system. Green indicates when the area measured is evolving towards sustainability, yellow if it is stable (i.e. moving in a range of + or −1%) and red if it is evolving away from sustainability. The SISTA's usability also was collectively and consciously strengthened (Bauler, 2012), and the group's graphic designer carefully and intentionally designed the user interface. Figure 3.3 is an example of a SISTA visualisation of a specific key area's data, which helps users to interpret that area's current state easily and quickly.

Figure 3.3 Example of SISTA visualisation: key theme of heritage resources within key area of quality



Source: Based on Junta de Andalucía (2016d)

The system's use of composite indicators and its focus on the target audience resulted in a user-friendly interface design that ensures end users can interpret and understand each element without difficulty. Usability is thus an important contribution of the SISTA performance measurement tool. This kind of instrument must be able to provide overall assessments of on-going developments in the defined areas so that findings can be easily interpreted and communicated to the intended audiences (Miola & Schiltz, 2019).

In the last phase (i.e. test), the results revealed that calculating the indicators was quite doable. Andalusia's highly developed statistics production facilitated the calculation of 79% of the 348 indicators using freely available official sources. Information was still lacking for specific indicators since their status as new topics (e.g. mobile technologies) meant that inadequate attention was given to those areas (e.g. accessibility) or the necessary stakeholders (e.g. governance) were not collaborating sufficiently.

The time unit for each indicator's calculation was a year, but the time frame for the benchmarking period was defined according to planning periods (i.e. four years), starting in 2012 as the first year after the previous planning period. The reference point for each indicator, in most cases, was the average value calculated for the 2008–2011 period, which served as the baseline. The SISTA-WG members who tested the indicators fed data into the system based on the available statistical information, which did not always correspond to the calendar year. Thus, when the policy actors asked for an annual update, what they got was snapshots of the results based on the data obtainable at that time.

The policy actors identified two types of analysis that could use the SISTA's findings. The first was strategic evaluations to develop departure and arrival scenarios accurately portraying the tourism destination's situation before and after plans are implemented. The second analysis was continuous assessments that warn of deviations in results or significant changes to the environment, allowing them to correct problems in time and avoid imbalances in sustainable tourism development.

To maximise the system's analytical capabilities, the SISTA-WG responded to the policy actors' requirements by setting relevant targets that assess progress towards greater sustainability using simple indicators. This approach uses dynamic composite indicators as a system of alerts (Lozano-Oyola et al., 2019) and facilitates analyses of sustainability's evolution from a reference point to the final measurement, as recorded in the destination's data. The SISTA shows indicators' tendencies throughout the four-year planning interval, but the indicator values cannot be compared to absolute thresholds or benchmarks. Thus, the SISTA is not designed to offer conclusive measurements, that is, whether the destination is sustainable overall, but the indicators allow stakeholders to know how well the destination is progressing.

This section explained how policy actors influenced the SISTA's design and implementation, thereby examining the outcomes of institutional influences on the process from within that organisation based on institutional theory (Estol et al., 2018). The next section discusses the choices made and the ways the organisation involved managed its institutional environment, providing an unusual perspective on current practices with reference to institutional theory (Suddaby, 2010). The present findings can also, on a practical level, help other tourism destinations that intend to implement a system of sustainability indicators.

3.5 Discussion and conclusions

This research argues that, while actors within tourism management organisations have the power to shape institutions, structures and patterns of behaviour remain in order to maintain legitimacy (DiMaggio & Powell, 1983). Actors trying to exert change often experience conflicting influences with established practices, but the increased attention to sustainable tourism indicators may overcome resistance, allowing the measurement of tourism sustainability with a view to enhancing results.

Focussing on the RQ1, any real-world integration of long-term sustainability requires transformative change in governments (David & Bitektine, 2009) posing challenges related to temporality and uncertainty. Temporality is related to the short periods covered by measurement scales used to guide political and policy

cycles, while uncertainty arises from the difficulty of judging policy measures' efficiency (Hall, 2011).

Transformations of dynamic sectors such as tourism have traditionally been guided by short-term electoral goals and thus lack a more strategic long-term vision (Go et al., 1992; Vogev & Swanson, 1988). Indicators must be maintained, tested and adjusted over time, allowing tourism organisations to evolve and adapt accordingly, leading to permanent change and perceptible benefits for policymakers (Hezri, 2004; Francheschini, 2007). The SISTA was conceived as a long-term tool, however its practical application over the ensuing years has remained partial, either focusing on an isolated key theme (i.e. tourism employment) or a catalogue of relevant indicators to meet specific planning objectives such as in the regional government's plan to reduce seasonality from 2016 to 2018 (Junta de Andalucía, 2016c) or the Tourism Marketing Plan of the Regional Government, Horizonte 2020 (Junta de Andalucía, 2016a).

Uncertainty challenges usually imply that policy actors are reluctant to expose potentially negative indicators, preventing public opinion makers and potential voters from seeing poor results as the current officials' direct responsibility.

SISTA was created over several years of partial applications and the resulting large number of indicators, further threaten its survival. Information from diverse sources must be updated periodically, and improvements required by the system´s evolution incorporated, necessitating one full-time and one part-time official. Government staff resources cannot fully satisfy this need, and officials currently have to combine their regular duties with SISTA maintenance. While this allows staff members to meet specific requests within a reasonable period, officials are still unable to maintain the full range of SISTA's components to ensure a complete and continuous measurement.

A system of indicators of sustainable tourism development should not be endangered by budgetary fluctuations, changes in the macroeconomic environment or political shifts. In many organisations, the leadership's commitment to developing and applying performance measures is a critical element in the success of the indicator system (Franceschini et al., 2007). SISTA has evolved in terms of goals and structure, but the project has not been immune to political environment changes. Nevertheless, policy actors have benefited from the knowledge of their organisations acquired over the years.

Despite these challenges that have affected the longer term, practical application of the SISTA and its development process generated positive outcomes (RQ2). Firstly, awareness among policy actors of the strategic uses of data to support policy decisions, as opposed to simply supporting political discourses.

Also, any policy-learning process which primarily focuses on defining policy instruments and/or indicators could be seen merely as first-order change. Nevertheless, another benefit generated by this process is the introduction of new policy-related indicators, so, this process has the potential to become second-order change if the new policy paradigms are at work (Hall, 2011). For example, the definition of sustainability in the General Plan for Sustainable Tourism of Andalusia, Horizon 2020 (Junta de Andalucía, 2016b) adds new dimensions to the traditional concept that only included the economic, environmental and social.

The SISTA experience was a process of continuous improvement, integrating advances in definitions, methodologies or statistical and/or documentation tools. While the end goal of this development process was to create a system for measuring sustainability in tourism, the process itself provided many other secondary benefits of significant interest. Similar experiences of such added value have been reported elsewhere, including in other countries implementing frameworks for sustainable development goals (Eurostat, 2018). These secondary benefits could well prove to be more important than the final results in terms of performance (Miola & Schiltz, 2019).

The SISTA process generated intangible benefits (Gahin et al., 2003) such as building networks between academic and policymaker stakeholders, offering mutual learning opportunities (Becker, 2005). Knowledge exchanges occurred in sustainability measurement, statistics, information sources and governance, among other areas. On the other hand, in the empirical dimension, the system of indicators developed for policy-making purposes facilitates the identification of the aspects considered most important.

The policy actors' integration in the process of creation of a system of indicators has not served the purpose of identifying a set of core indicators that can be applied to any destination (RQ3). Although researchers agree on sustainability's basic dimensions, no clear consensus has been reached on a framework for measuring sustainable tourism (Asmelash & Kumar, 2019; Cernat & Gourdon, 2012; Torres-Delgado & Saarinen, 2014), hence no list of standard indicators exists. This lacuna in the literature directly affects tourism destinations' ability to implement benchmarking. Efforts have focused primarily on developing new sets of indicators that reflect case studies, such as SISTA. This destination-specific approach should, nonetheless, be compatible with determining a set of core indicators that integrate basic aspects of sustainability at a more holistic or global level (Roberts & Tribe, 2008).

However, these statistical results alone cannot provide all the necessary insights; SISTA WG found that some significant sustainable tourism objectives have yet to be

integrated into official statistics producers' priorities. Further cooperation with these producers could help move neglected issues to the top of political agendas for tourism (e.g. sustainability, accessibility and job quality), thereby changing the priorities of official statistics.

Indicator systems need to strike a balance between context-dependent specificity and comprehensive relevance (Torres-Delgado & Saarinen, 2014). Using standard basic indicators could make benchmarking between tourism destinations more viable and facilitate the setting of feasible targets based on values obtained by similar destinations. This broader approach could generate new opportunities to conduct analyses often unavailable with current indicator systems.

Furthermore, researchers acknowledge that systematic official statistics enable comparisons between destinations, which clearly increases the availability of data on basic variables, necessary to build homogeneous indicators and comparable systems. Advances have already been made, such as the work done by Eurostat, towards making information available at a regional level (i.e. Nomenclature of Territorial Units for Statistics-2). However, the results indicate that further work is required, something especially evident at local level as only 30% to 40% of the ETIS's requirements (European Commission, 2016) can be met with existing official statistics (Font, 2019).

Besides the above conclusions, the investigation addresses many studies' uncritical attitude towards their proposed solutions' validity and usefulness, which has contributed to poorly informed policy recommendations (Budeanu et al., 2016). These results serve as a reference for any tourism destination seeking to develop a useful measurement system for practitioners as well as helping academic researchers adapt proposed measurement tools to increase their applicability.

Finally, this research provides support for the shift from the traditional focus of institutional theory on gathering data from outside the organisations in question towards an internal interpretation process (Suddaby, 2010). In particular, actors within public tourism organisations can play an important role in introducing the sustainability policy paradigm discussed in this research by designing, maintaining and adjusting new related indicators over time. However, research in this field would benefit from a more institutional lens, one that explores the participation of residents and the private sector in policy making for destinations as well as the efficiency of administrative processes and its influence in building and maintaining sustainable policies in tourism.

Chapter 4. Conclusions

This thesis has explored how policy makers can take advantage of data to improve the policy design process. It has done it by considering two separate case studies applied to two topics, energy consumption and tourism, which entail relevant policy questions and which have important implications for sustainability. It is worth noticing that each case study was selected because they belong to a distinct phase of the policy design process.

The first case study (Chapters 1 and 2) has dealt with an ex-post evaluation of a significant collective switching initiative implemented in the UK in 2012. In order to perform this evaluation exercise, it was necessary to develop two methodological contributions.

The first methodological innovation concerns the process of turning a commercial database into a database suitable to answer research questions. In this process, a survey was designed and implemented on participants from the collective switching initiative to "unveil the reasons for taking cheaper deals". The main conclusion from the survey responders is that a large fraction of consumers does not switch to lower energy prices when they are offered a better deal through the Collective Switching Campaign.

The first take out message for policy makers should therefore not take for granted that consumers will behave in a fully rational way and therefore that (i) policy design needs to take behavioural considerations into account and (ii) policy evaluation needs to be one on every single policy intervention. By uncovering the reasons behind consumer reluctance to switch and highlighting the limitations of market expectations, this research contributes valuable insights to guide policy interventions and market regulations in the energy sector.

A second interesting take out is that the evaluation exercise should not be based exclusively on survey respondents. The analysis of any survey will basically provide biased results because they always be conditional on participation. This is critical but this is actually the standard approach to evaluate the success of collective switching campaigns. This needs to change. The bigger question seems to be if a particular intervention is successful in promoting a particular behaviour on different segments of the general population. The second chapter takes this approach and answers whether this kind of initiative is helpful in fighting fuel poverty.

Our methodological innovation based on zero-inflated count data methodology is able to distinguish the awareness process –whether different segment of the population gets knowledge of the existence of the policy intervention- from the

engagement process –whether different segments of the population, conditional on knowing the intervention, takes part in it-.

Our results show that none of the vulnerability dimensions as defined by the UK regulator impacts negatively on awareness. On the contrary, rural areas and those belonging to the lowest income quartile are significantly more aware of The Big Switch initiative. But when households are required to act on the information, we find that rural areas and those with a larger percentage of senior population are more active.

We find two types of extremely disengaged households -meaning that they are less aware and that conditional on awareness, register less: households with children and highly deprived ones. Our analysis reveals that the effect of vulnerability on engagement is cumulative, and that special emphasis should be placed on these two types of households when fighting energy poverty using collective switching initiatives.

The final chapter focuses on how to develop a system of indicators to effectively measure the impact of tourism activities on sustainable development. Systems of indicators are widely used in tourism sustainability management but they are mainly develop by academics to be used by policy actors. In order to reduce the gap between the views from academics and policy actors, we have analysed a case study that centers on the Andalusia System of Sustainable Tourism Development Indicators (SISTA), which serves as a monitoring tool for regional government policies. This system was collaboratively developed by an interdisciplinary group of 15 experts representing both the regional government and academia.

The main lesson from this case study is that policy actors' participation enhanced the systems' usefulness, introducing the sustainability policy paradigm and raising awareness of the strategic uses of data to support policy decisions. On the other hand, challenges of policy actors' participation are related to the mismatch between sustainability evolution and policy cycles, and from the difficulty of judging policy measures' efficiency. This research will serve as a reference for other tourism destinations working on measuring system development with practical applications as well as for academia to integrate policy actors' needs into theoretical approaches.

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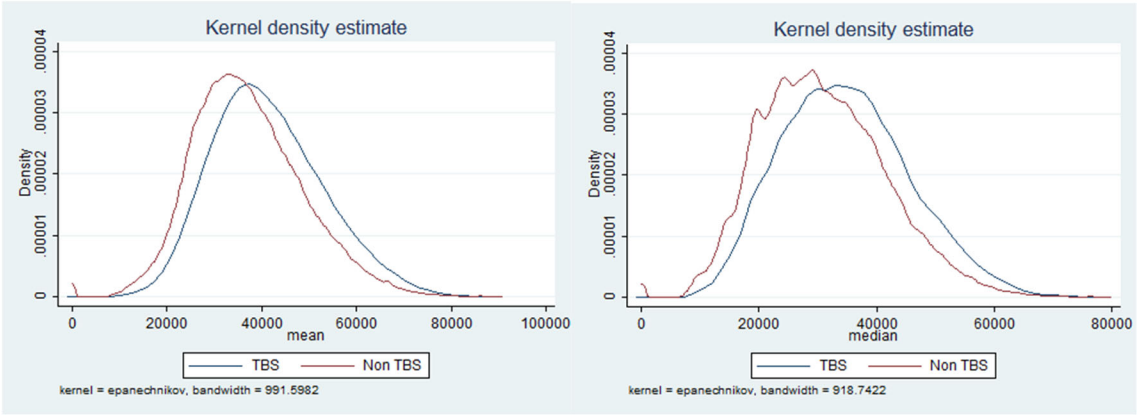
APPENDIX 1.

Appendix 1.1. Analysis of postcodes income distribution

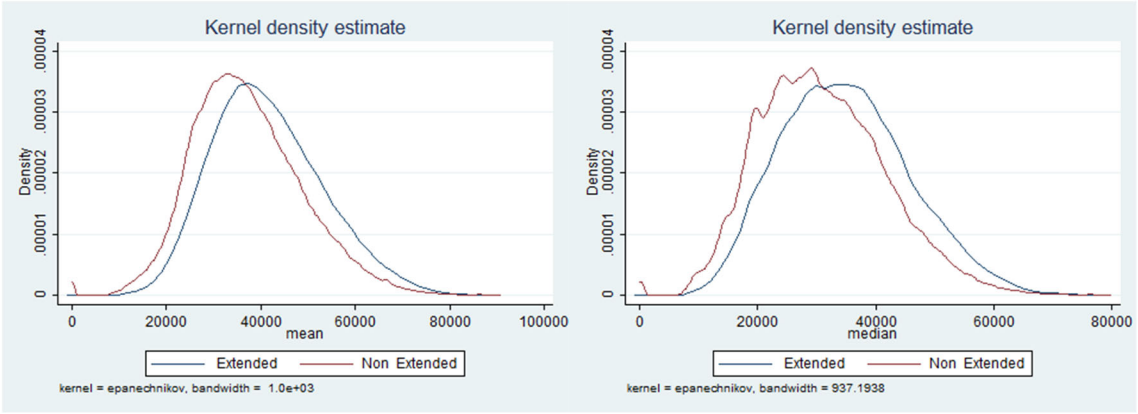
Analysis of postcodes: All vs TBS



TBS postcodes		N	Mean	SD	Std. Error Mean
mean	Rest of postcodes	2,340,690	37,119	11,616	7.6
	Joined TBS	137,055	41,412	11,735	31.7
median	Rest of postcodes	2,340,690	30,893	10,750	7.0
	Joined TBS	137,055	34,713	10,873	29.4

Independent sample test: **Statistically significant difference** between 2 conditions: those that expressed interest in TBS and the rest of postcodes.

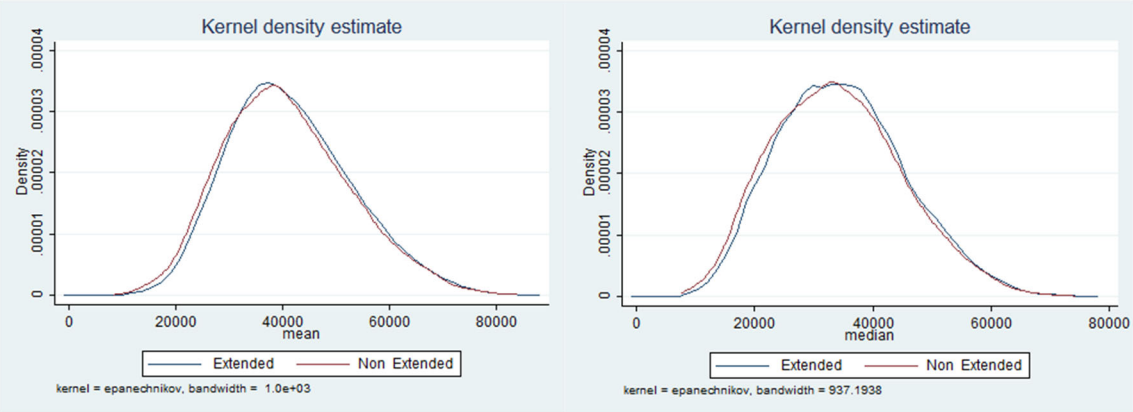
Analysis of postcodes: All vs Extended



Extended Postcodes		N	Mean	SD	Std. Error Mean
mean	Rest of postcodes	2,354,721	37,140	11,621	7.6
	Gave details	124,803	41,492	11,713	33.4
median	Rest of postcodes	2,354,721	30,912	10,754	7.0
	Gave details	124,803	34,788	10,854	30.9

Independent sample test: **Statistically significant difference** between 2 conditions: those that gave all the details for TBS and the rest of postcodes.

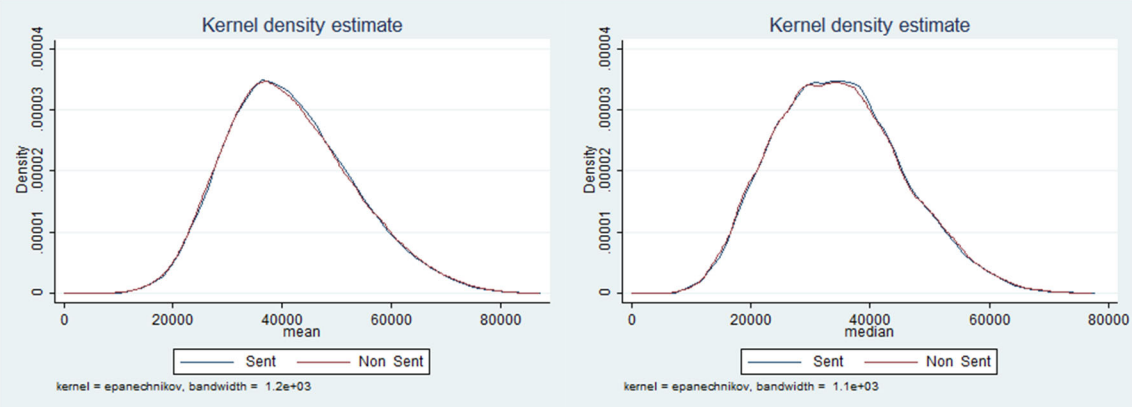
Analysis of postcodes: TBS vs Extended



TBS vs Extended		N	Mean	Std. Deviation	Std. Error Mean
mean	Just expressed interest	14,031	40,713	11,899	100.5
	Gave details	124,803	41,492	11,713	33.4
median	Just expressed interest	14,031	34,050	11,013	93.0
	Gave details	124,803	34,789	10,853	30.9

Independent sample test: **Statistically significant difference** between 2 conditions: those that just expressed interest and those that gave all the details for TBS (some intersection between both groups).

Analysis of postcodes: Extended vs Sent Follow up Survey

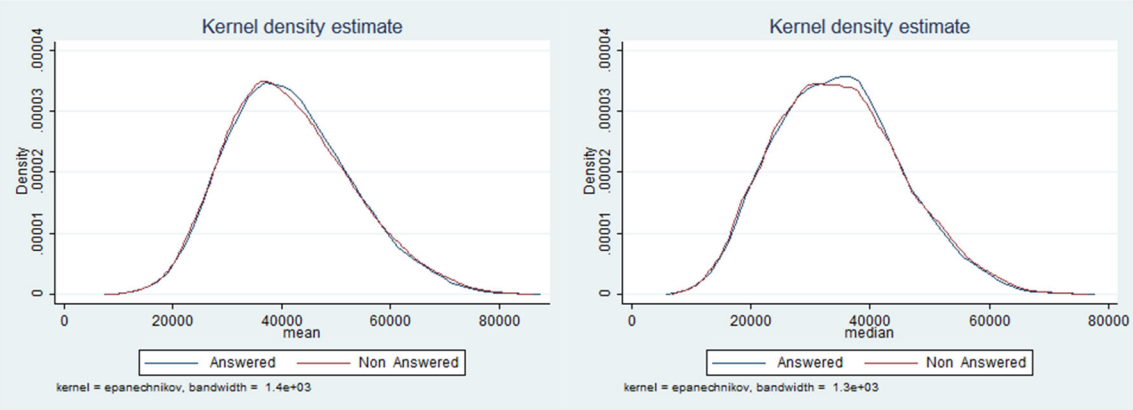


Group Statistics

Extended vs Sent		N	Mean	SD	Std. Error Mean
mean	Did not receive the questionnaire	67,954	41,482	11,798	45.9
	Received the questionnaire	56,858	41,504	11,613	48.7
median	Did not receive the questionnaire	67,954	34,773	10,924	42.5
	Received the questionnaire	56,858	34,807	10,771	45.2

Independent sample test: **NOT Statistically significant difference** between 2 conditions: those postcodes that received the questionnaire and those that did not (some intersection between both groups).

Analysis of postcodes: Answered the follow up survey vs did not answer



Group Statistics

Sent vs Answered		N	Mean	SD	Std. Error Mean
mean	Did not answered	38,430	41,505	11,699	59.7
	Answered	18,428	41,501	11,430	84.2
median	Did not answered	38,430	34,824	10,860	55.4
	Answered	18,428	34,771	10,583	78.0

Independent sample test: **NOT Statistically significant difference** between 2 conditions: those postcodes that answered the questionnaire and those that did not (some intersection between both groups).

APPENDIX 1.2 Pilot questionnaire

Did not switch Pilot

Q1.1 Informed Consent Form This study attempts to collect information about differences in individual perception of the energy market in order to understand better those aspects that affect the (non) switching behaviour of consumers. Which? consumers association has provide the University of East Anglia your contact details with the aim of undertake an university-based impartial general research of independence and research nature. The questionnaire will take approximately 5 minutes or less. There are no direct benefits for participants. However, it is hoped that through your participation, researchers will learn more about which aspects affect the probability of switching. All data obtained from participants will be kept confidential and will only be reported in an aggregate format (by reporting only combined results and never reporting individual ones). Participation in this research study is completely voluntary. You have the right to withdraw at any time or refuse to participate entirely. If you have questions regarding this study, you may contact (shall we use a special UEA e-mail address for this purpose?), principleinvestigator@fakeemail555.com.

Q1.2 I have read and understood the above consent form and desire of my own free will to participate in this study.

- ❍ Yes (1)
- ❍ No (2)

If No Is Selected, Then Skip To End of Survey

Q2.3 When did you last switch your energy supplier (gas or electricity)?

- ❍ After the Big Switch (1)
- ❍ Up to 2 years ago (2)
- ❍ More than 2 years ago (3)
- ❍ I have never switched (4)
- ❍ I don't know whether I have ever switched (5)

Q2.4 Do you remember the saving amount, in pounds, offered to you by The Big Switch Campaign?

_____ Yes, it was more or less... (1)

Answer If When did you last switch your energy supplier (gas or ele... After the Big Switch Is Selected

Q3.1 What prompted you to switch? Multiple choice

- ❑ The Big Switch stimulated me to look around (1)
- ❑ I wasn't happy with my supplier (2)
- ❑ My supplier changed only because I moved house (3)

Answer If When did you last switch your energy supplier (gas or ele... After the Big Switch Is Selected Or When did you last switch your energy supplier (gas or ele... Up to 2 years ago Is Selected

Q3.2 Tell us some information about your switching process Multiple choice

- ❑ To switch, I contacted supplier or suppliers directly or looked at their websites (1)
- ❑ To switch, I used one or more price comparison websites (2)
- ❑ To switch, I used one or more price comparison telephone lines (e.g. the Energy Helpline) (3)
- ❑ To switch, I spoke to friends or family about who supplied their energy (4)
- ❑ To switch, I didn't explore any deals available at other supplier (5)

Answer If To switch, I used one or more price comparison websites Is Selected Or To switch, I used one or more price comparison tlephone lines (e.g. the Energy Helpline) Is Selected

Q3.4 Did you have the bill in front of you when you gave your details to the price comparison site/ telephone line?

- ❍ Yes (1)
- ❍ No (2)

Answer If When did you last switch your energy supplier (gas or ele... After the Big Switch Is Selected

Q4.1 The Big Switch Campaign offered you ${e://Field/savings} of annual saving, with an annual cost of ${e://Field/CurrentCost} Why did you not switched?

I did not switch using The Big Switch Campaign because (1)
I did not switch using The Big Switch Campaign because (2)
I did not switch using The Big Switch Campaign because (3)
I did not switch using The Big Switch Campaign because (4)

If I did not switch using The ... Is Displayed, Then Skip To End of Survey

Answer If When did you last switch your energy supplier (gas or ele... After the Big Switch Is Not Selected

Q47 The Big Switch Campaign offered you ${e://Field/savings} of annual saving, with an annual cost of ${e://Field/CurrentCost} Can you give us three reasons why did you not switched?

First reason (1)
Second reason (2)
Third reason (3)

Answer If When did you last switch your energy supplier (gas or ele... After the Big Switch Is Not Selected

Q4.2 Do you agree with the following statement? I did not switch because the saving I obtained was not big enough

- Yes (1)
- No (2)

Answer If Do you agree with the following statemen?   I did ... Yes Is Selected

Q4.3 What should be the smallest amount of money you would have needed to be sure to save per year to persuade you to leave your previous energy supplier?

_____ Minimum saving amout per year needed to switch (1)

Answer If When did you last switch your energy supplier (gas or ele... In the last six months Is Not Selected And When did you last switch your energy supplier (gas or ele... 7-12 months ago Is Not Selected

Q4.4 Can you write which are the main barriers for you to switch energy supplier?

I don't usually switch because (1)
I don't usually switch because (2)
I don't usually switch because (3)

Answer If When did you last switch your energy supplier (gas or ele... In the last six months Is Not Selected And When did you last switch your energy supplier (gas or ele... 7-12 months ago Is Not Selected

Q4.5 Can you write what could make you switch?

I would switch if (1)
I would switch if (2)
I would switch if (3)

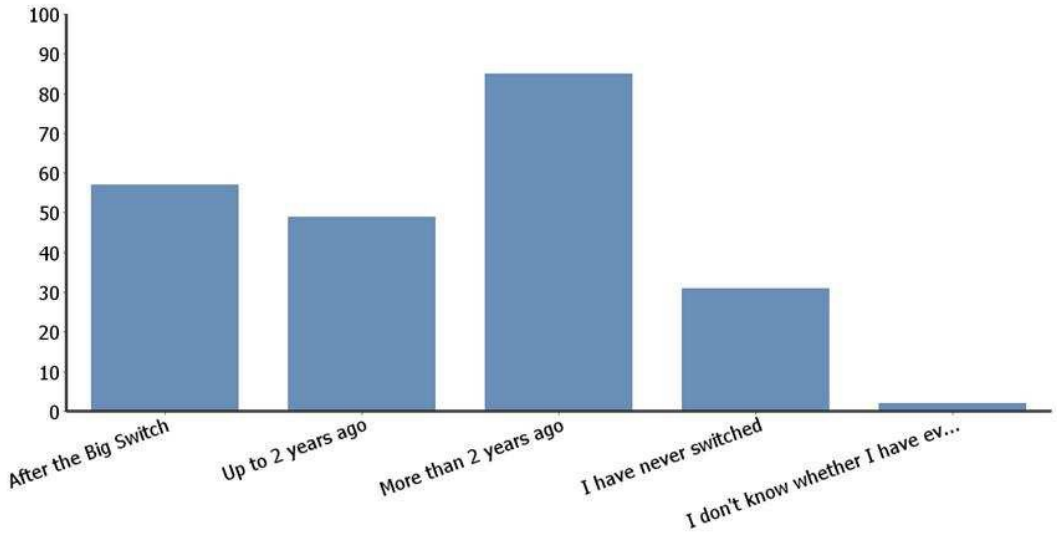
APPENDIX 1.3 Pilot responds for respondents

When did you last switch your energy supplier (gas or electricity)?

Although they did not switch as part of TBS itself, more than 25% of the respondents stated that they switched their energy supplier after TBS.

Another 22% of respondents had switched during the previous 2 years, while more than 25% had done so more than 2 years ago.

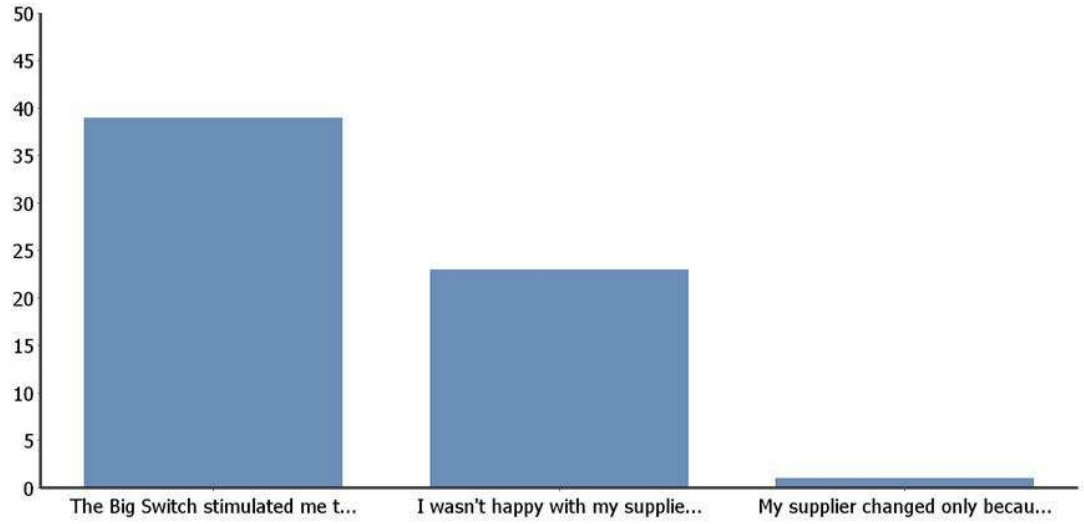
13.8% said they had never switched and a very small proportion did not know whether they had ever switched.



Answer	Bar	%
After the Big Switch		25.45%
Up to 2 years ago		21.88%
More than 2 years ago		37.95%
I have never switched		13.84%
I don't know whether I have ever switched		0.89%
Total		100.00%

What prompted you to switch?

More than 68% of those respondents who switched energy supplier after TBS declared that this campaign stimulated them to look around. The next most frequent reason given for switching since the TBS was dissatisfaction with their supplier.



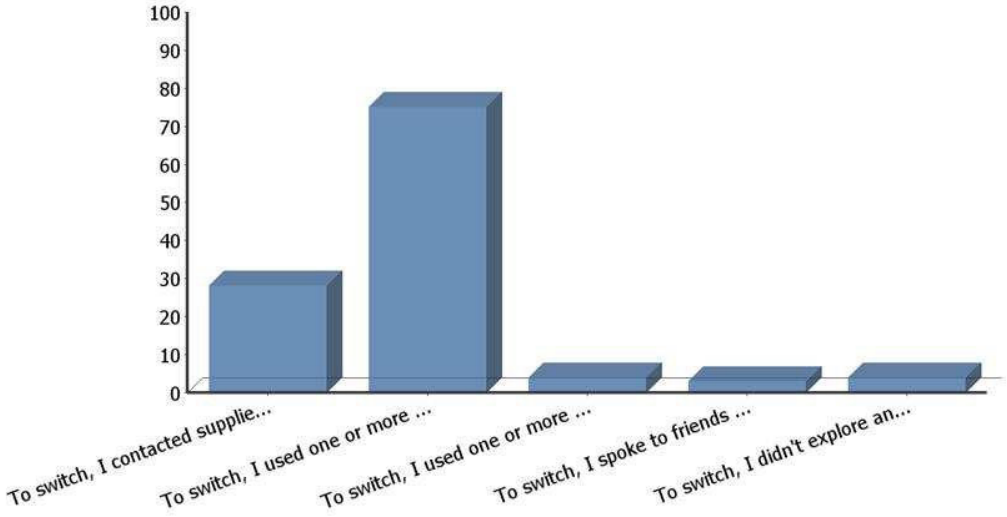
Answer	Bar	%
The Big Switch stimulated me to look around		68.42%
I wasn't happy with my supplier		40.35%
My supplier changed only because I moved house		1.75%
Total		100.00%

N.B. The total comes to more than 100% because each respondent could give more than one answer

Information about the switching process

Of those who switched energy supplier up to 2 years ago (including those switching after TBS), most used price comparison websites, while 27% of them said that they contacted suppliers directly.

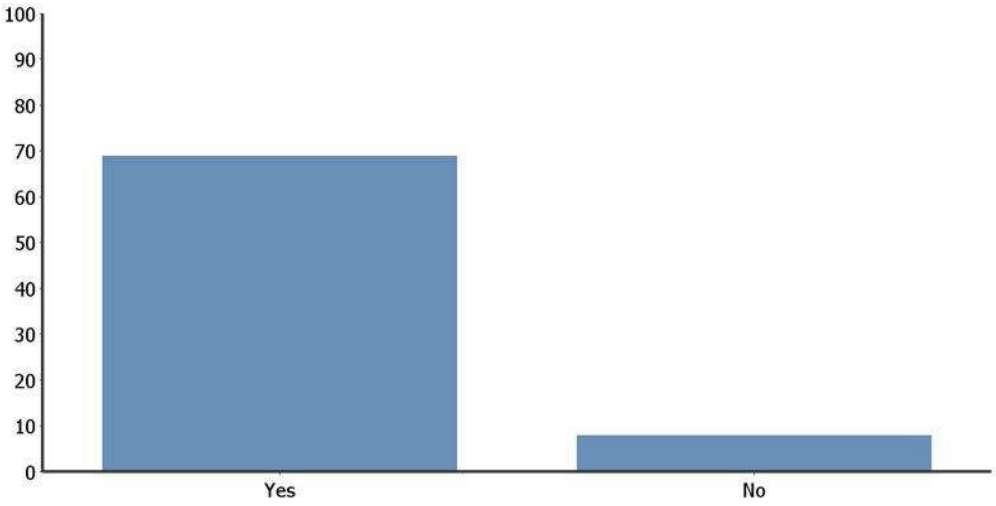
N.B. The total comes to more than 100% because each respondent could give more than one answer



Answer	Bar	%
To switch, I contacted supplier or suppliers directly or looked at their websites		27.18%
To switch, I used one or more price comparison websites		72.82%
To switch, I used one or more price comparison telephone lines (e.g. the Energy Helpline)		3.88%
To switch, I spoke to friends or family about who supplied their energy		2.91%
To switch, I didn't explore any deals available at other supplier		3.88%
Total		100.00%

Did you have the bill in front of you when you gave your details to the price comparison site / telephone line?

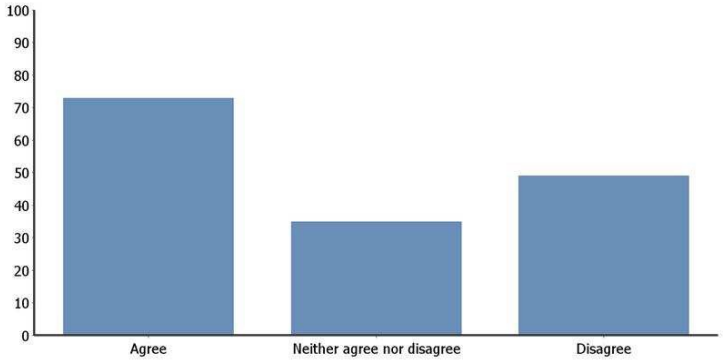
Most respondents who switched energy supplier up to 2 years ago (including those switching after TBS) and who used price comparison websites or telephone lines had the bill in front of them while giving the details.



Answer	Bar	%
Yes		89.61%
No		10.39%
Total		100.00%

I did not switch through The Big Switch because the saving I was offered was not large enough.

Almost half of the consumers who did not switch after TBS declared that the reason was that they were not offered large enough savings. The average amount per year they said they would have needed to persuade them to switch supplier was £186.91. (It should be borne in mind this survey was sent only to those consumers who could have got a benefit of more than £63 per year.)



Answer	Bar	%
Agree		46.50%
Neither agree nor disagree		22.29%
Disagree		31.21%
Total		100.00%

APPENDIX 1.4 Questionnaire Non Switchers follow up

Q2.2 What is your current age group?

- ❑ 15 to 24 (1)
- ❑ 25 to 34 (2)
- ❑ 35 to 44 (3)
- ❑ 45 to 54 (4)
- ❑ 55 to 64 (5)
- ❑ 65 to 74 (6)
- ❑ 75 or over (7)

Q2.3 What is your gender?

- ❍ Male (1)
- ❍ Female (2)

Q2.4 What is the highest level of education you have completed?

- ❍ GCSE/O-Level/ CSE (1)
- ❍ Vocational qualifications (2)
- ❍ A-Level or equivalent (3)
- ❍ First Degree or equivalent (4)
- ❍ Masters/PhD or equivalent (5)

Q2.5 In which of these ways do you occupy your accommodation?

- ❍ Own it outright (1)
- ❍ Buying it with the help of a mortgage or loan (2)
- ❍ Pay part rent and part mortgage (shared ownership) (3)
- ❍ Rent it (4)
- ❍ Live here rent-free (i.e. relative's/friend's property) (5)

Q2.6 How many adults (16 and over) there are in your household?

- ❍ 1 (1)
- ❍ 2 (2)
- ❍ 3 (3)
- ❍ 4 (4)
- ❍ 5 or more (5)

Q2.7 In my household at least 1 person is: Please tick as many boxes as apply

- ❑ Employed full time (1)
- ❑ Employed part-time (2)
- ❑ Homemaker (3)
- ❑ Retired (4)
- ❑ Unemployed (5)
- ❑ Student (6)

❑ Other (please specify) (7) _____

Q2.8 What is your postcode?

Q2.9 Is any member of the household in receipt of disability benefit?

❍Yes (1) ❍No (2)

Q2.10 Does your household receive any of these benefits? Please tick as many boxes as apply

❑ Warm House Discount (1)
❑ Winter fuel payment (2)
❑ Cold weather payment (3)
❑ Renewable Heat Incentive (4)
❑ Warm Front Scheme (5)
❑ Other energy related benefit (please specify) (6) _____
❑ None of the above (7)

Q3 When did you most recently switch your energy supplier?

❍ After The Big Switch (1)
❍ Up to 2 years ago but before The Big Switch (2)
❍ More than 2 years ago (3)
❍ I have never switched (4)
❍ I do not know whether I have ever switched (5)

Q4.1 On the last occasion that you switched, please, select as appropriate:

❍ I switched my gas supplier (1)
❍ I switched my electricity supplier (2)
❍ I switched both suppliers to a single supplier (3)
❍ I switched both suppliers to two different suppliers (4)

Q4.2 – Q4.4 To which supplier did you switch for electricity? Q4.3 for gas and Q4.4 for both

❍ Atlantic Electric and Gas (1)	❍ iSupplyEnergy (11)	❍ Scottish Power (21)
❍ British Gas (2)	❍ LoCO2 Energy (12)	❍ SEEBOARD Energy (22)
❍ Co-Operative Energy (3)	❍ London Energy (13)	❍ Southern Electric (23)
❍ E.ON (4)	❍ M&S Energy (14)	❍ Spark Energy (24)
❍ EBICo (5)	❍ npower (15)	❍ SSE (25)
❍ Ecotricity (6)	❍ npower National Trust (16)	❍ SWALEC (26)
❍ EDF Energy (7)	❍ OVO Energy (17)	❍ SWEB Energy (27)
❍ first:utility (8)	❍ Sainsburys (18)	❍ The Utility Warehouse (28)
❍ Good Energy (9)	❍ Sainsbury's Energy (19)	❍ Union Energy (29)
❍ Green Energy UK (10)	❍ Scottish Hydro (20)	❍ Utilita (30)

Q5.1_Q5.4 How likely is that you will seriously consider switching energy supplier within the next (Q5.1 six months, Q5.2 year, Q5.3 2 years, Q5.4 5 years) ? (i.e. look around for a better deal even if you don't actually change)

Q6.2 Did you have an exit fee at the time of The Big Switch?

❍ Yes, and I knew the amount at the time I filled in the form (amount in £) (1) _____

❍ Yes, and I didn't know the amount at the time I filled in the form (2)

❍ I didn't know whether I had an exit fee (3)

❍ No, I didn't have an exit fee (4)

Q6.3 At the time of The Big Switch, did you face any other penalty or loss of benefits (apart from an exit fee) if you switched supplier? Please tick as many boxes as apply

❑ Loss of "cash back" (1)

❑ Other loss of benefits, such as (2) _____

❑ None (3)

❑ I don't know (4)

Q6.4 How long would you have had to wait after you received the offer from The Big Switch before you could have changed without penalty (exit fee or loss of other benefit)?

❍ Up to 6 months (1)

❍ I can't remember (4)

❍ 6 months to 1 year (2)

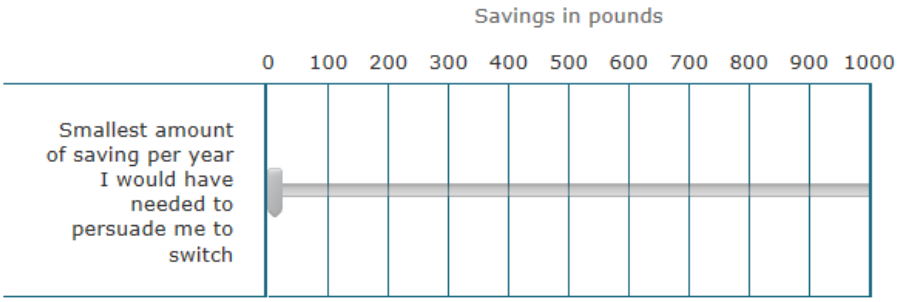
❍ More than 1 year (3)

Q6.5 Why did you take part in The Big Switch ? Please tick as many boxes as apply

- ❑ I wanted to save money (1)
- ❑ I was curious about the campaign (2)
- ❑ I wanted to encourage lower prices across the energy market (3)
- ❑ Other (please specify) (4) _____

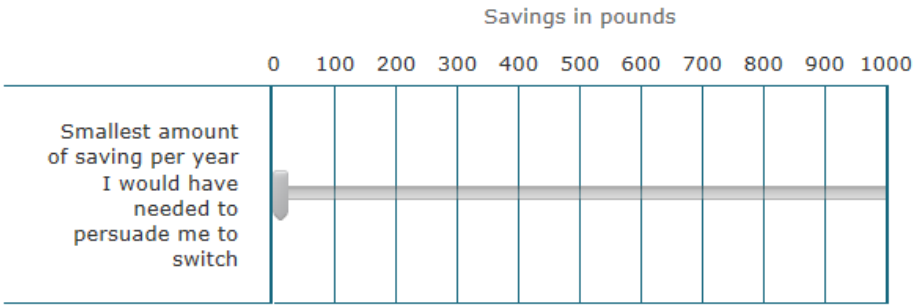
Q7.1

The Big Switch offered you ${e://Field/SavingAmount} pounds of annual saving, on a basis of an annual expenditure of ${e://Field/Cost} pounds.
How much would you have needed to save in order to persuade you to switch energy supplier?



Q7.2

How much would you have needed to save in order to persuade you to switch energy supplier?



Q7.3

The Big Switch offered you ${e://Field/SavingAmount} pounds of annual saving, on a basis of an annual expenditure of ${e://Field/Cost} pounds.
How much would you have needed to save in order to persuade you to switch energy supplier?

Smallest amount of saving per year I would have needed to persuade me to switch (£)

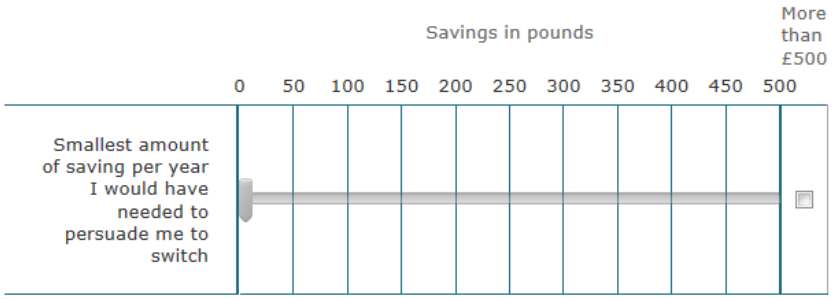
Q7.4

How much would you have needed to save in order to persuade you to switch energy supplier?

Smallest amount of saving per year I would have needed to persuade me to switch (£)

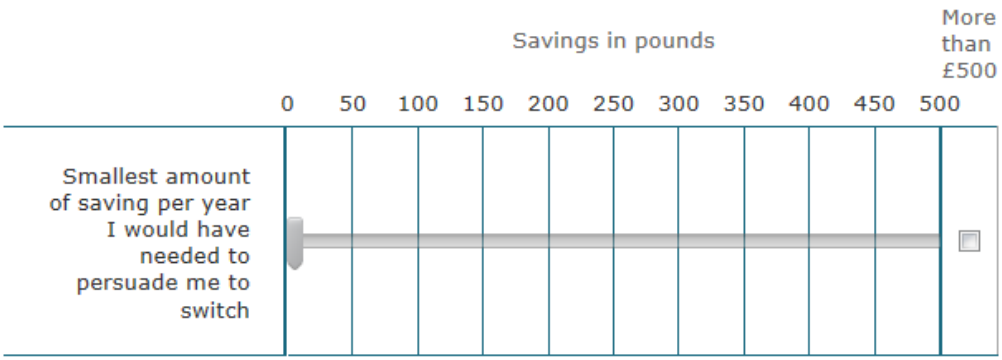
Q7.5

The Big Switch offered you ${e://Field/SavingAmount} pounds of annual saving, on a basis of an annual expenditure of ${e://Field/Cost} pounds.
How much would you have needed to save in order to persuade you to switch energy supplier?



Q7.6

How much would you have needed to save in order to persuade you to switch energy supplier?

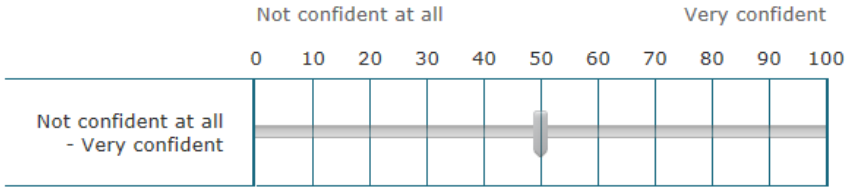


Q8.1

If it is more than £500, can you write down the smallest amount of saving per year you would have needed to save in order to persuade you to switch energy supplier?

Smallest amount of saving per year I would have needed to switch

Q9.1 **How confident were you that the savings presented to you in The Big Switch were accurate?**



Q9.2 At the time that you were considering whether to switch through The Big Switch, were you worried about any of the following? Please tick as many boxes as apply

- ❑ Something might go wrong with the switching process (1)
- ❑ The best deal would not be available for me after all (2)
- ❑ I would not understand the contract (3)
- ❑ It would be very time consuming (4)
- ❑ There would be problems with the new supplier (5)
- ❑ Other (6) _____
- ❑ None of the above (7)

Q9.3 If you had decided to switch, how much of your own time would you have expected it to take to complete the switching process?

- ❍ 0 to 5 min (1)
- ❍ 5 to 10 min (2)
- ❍ 10 to 20 min (3)
- ❍ 20 to 30 min (4)
- ❍ More than 30 min (5)

Q9.6 At the time that you were considering whether to switch at The Big Switch, were you happy with the customer service offered by your existing supplier?

❍Yes (1) ❍No (2)

Q9.7 – Q9.9 Thinking about your energy supplier: Could you tell us whether you had any particular preference between the supplier(s) offered to you in The Big Switch and your previous supplier on the following respects?

	I prefer Previous supplier or suppliers (1)	I prefer Best offer (2)	I prefer the Co-Op (3)	No preference in this respect (4)
Ethical reasons (1)	❍	❍	❍	❍
Environmental reasons (2)	❍	❍	❍	❍
Type of tariff (3)	❍	❍	❍	❍
Method of payment (4)	❍	❍	❍	❍
Other reasons (5)	❍	❍	❍	❍

Q9.10 Do you agree or disagree with the following statements? Tick whichever applies

	Strongly Agree (1)	Agree (2)	Neither Agree nor Disagree (3)	Disagree (4)	Strongly Disagree (5)
In general it is hard to set aside the time needed to switch suppliers (1)	❍	❍	❍	❍	❍
The timing of The Big Switch was an especially busy period for me (2)	❍	❍	❍	❍	❍

Q9.11 Would you have liked any other help in deciding whether to switch or not at The Big Switch? Please tick as many boxes as apply

- ❑ A reminder phone call (1)
- ❑ Phone support (2)
- ❑ Simpler switching process (3)
- ❑ Something else (please specify) (4) _____
- ❑ Nothing, I would not have liked any other help (5)

Q9.12 Did you ask your supplier for a better deal when you were deciding about The Big Switch?

- ❍ Yes, and I was offered one (1)
- ❍ Yes, and I wasn't offered one (2)
- ❍ I didn't ask and I wasn't offered one (3)
- ❍ I didn't ask but I was offered one anyway (4)

Q9.13 When you received the offer, did you change your tariff or method of payment with your existing supplier?

❍Yes (1) ❍No (2)

Q10 Thinking generally, what would be most important in persuading you to switch energy supplier? Please tick up to 3 reasons

- ❑ If the expected/predicted saving were large enough (1)
- ❑ If I could be confident about my figures of consumption and about the amount of money saved (2)
- ❑ If I could be confident that it was the best deal I could get among other suppliers' tariffs. (3)
- ❑ If I could be confident that the switching process would be problem free (4)
- ❑ If I was unhappy with my current supplier (5)
- ❑ If I could find an ethical supplier or if I could find a more environmentally friendly option (6)
- ❑ If the switching process was easy and quick (7)
- ❑ Other reasons (8) _____
- ❑ If I had spare time to devote to switching supplier (9)
- ❑ Nothing would persuade me to switch (10)
- ❑ If I could be confident that it would continue to be a relatively good deal for more than just a year (11)

Q11.1 Are you responsible for choosing the supplier for any of the following products? Please tick as many boxes as apply

- ❑ Mobile phone (1)
- ❑ Fixed phone line (2)
- ❑ Car insurance (4)
- ❑ Main mortgage (5)
- ❑ Main current bank account (6)
- ❑ I am not responsible for any of them (7)
- ❑ Broadband Internet connection at home (3)

Q11.2 Do you buy any of these products in a bundle?

- ❑ Fixed phone line + Mobile phone (3)
- ❑ Fixed phone line + Broadband Internet connection at home + Mobile phone (1)
- ❑ Fixed phone line + Broadband Internet connection at home (2)
- ❑ Broadband Internet connection at home + Mobile phone (4)
- ❑ Main Mortgage + Main current bank account (5)
- ❑ None of them (6)

Q11.3 Have you switched your supplier for?

	Less than 6 months ago (1)	Between 6 months and 2 years ago (4)	More than 2 years ago (5)	No, I have never switched (6)	I don't remember whether I have ever switched (8)
Mobile phone (1)	❍	❍	❍	❍	❍
Fixed phone line (2)	❍	❍	❍	❍	❍
Car insurance (3)	❍	❍	❍	❍	❍
Main mortgage (4)	❍	❍	❍	❍	❍
Main current bank account (5)	❍	❍	❍	❍	❍
Fixed phone line + Mobile phone (6)	❍	❍	❍	❍	❍
Fixed phone line + Broadband Internet connection at home + Mobile phone (7)	❍	❍	❍	❍	❍
Fixed phone line + Broadband Internet connection at home (8)	❍	❍	❍	❍	❍
Broadband Internet connection at home + Mobile phone (9)	❍	❍	❍	❍	❍
Main mortgage + main current bank account (10)	❍	❍	❍	❍	❍
Broadband Internet connection at home (11)	❍	❍	❍	❍	❍

Q11.4 Thinking about the last 2 years, would you please tick the statement that best applies to you for the following products:

	During the last 2 years I haven't given much thought to switching this product (1)	I thought about it but didn't get as far as looking seriously at the options (2)	I looked seriously at the options but thought it would be too difficult/time consuming/risky to switch and didn't take it anfurtherhe (3)	I looked seriously at the options but found I was on a good enough deal and didn't take it any further (4)	I looked seriously at the options but my existing provider offered me a better deal (5)
Mobile phone (1)	❍	❍	❍	❍	❍
Fixed phone line (2)	❍	❍	❍	❍	❍
Broadband Internet connection at home (3)	❍	❍	❍	❍	❍
Fixed phone line + Broadband Internet connection at home + Mobile phone (4)	❍	❍	❍	❍	❍
Fixed phone line + Broadband Internet connection at home (5)	❍	❍	❍	❍	❍
Fixed phone line + Mobile phone (6)	❍	❍	❍	❍	❍
Broadband Internet connection at home + Mobile phone (7)	❍	❍	❍	❍	❍
Car insurance (8)	❍	❍	❍	❍	❍
Main mortgage (9)	❍	❍	❍	❍	❍
Main current bank account (10)	❍	❍	❍	❍	❍
Main mortgage + main current bank account (11)	❍	❍	❍	❍	❍

Q12.1 If you would like to receive a summary of our report when it is complete, please tick the following box.

❍ Yes, I would like to receive a summary of this survey (1)
❍ No, thank you (2)

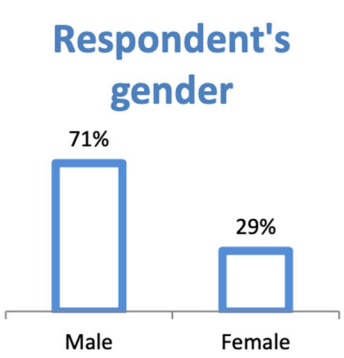
Q12.2 Would you be prepared to be contacted again by the University of East Anglia for related research?

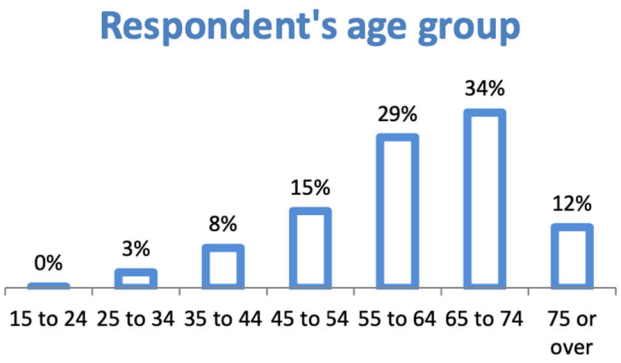
❍Yes (1) ❍No (2)

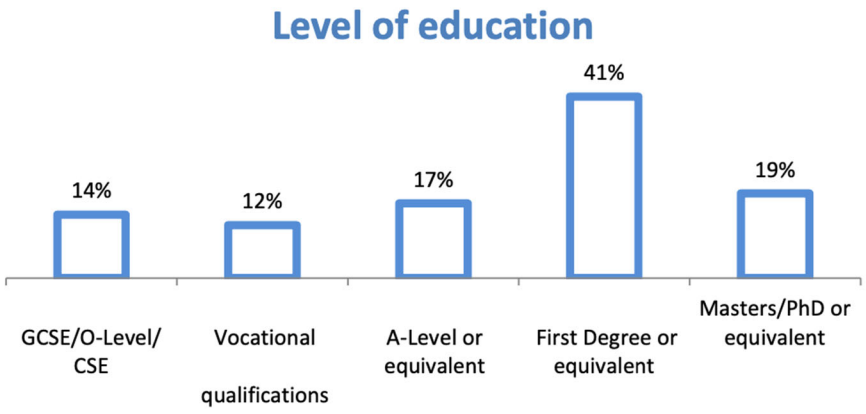
APPENDIX 1.5 Report for respondents follow up

Socio demographic characteristics of respondents

The typical respondent of this survey is male, aged between 65 to 74, with a high level of education (first degree or more).

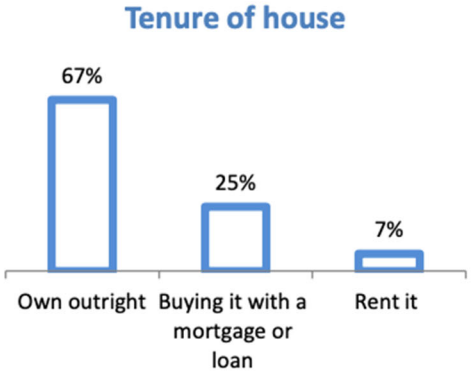


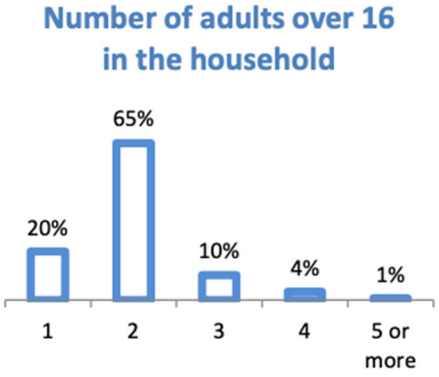


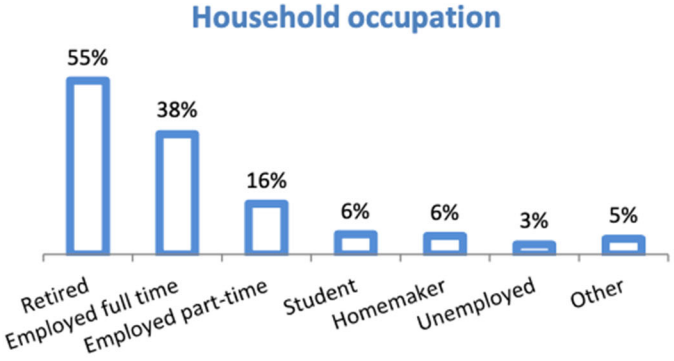


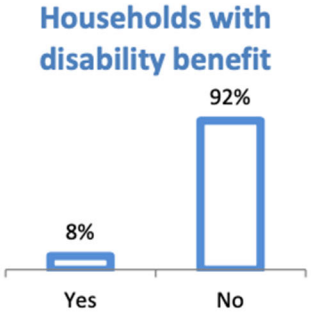
Household characteristics

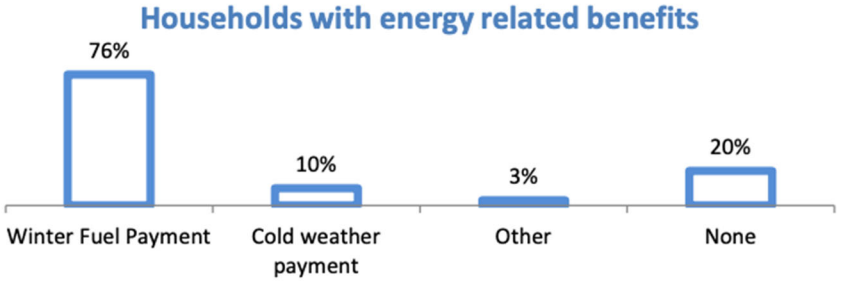
67% of respondents own their house, and 65% live in a household of two adults. More than h these households include a retired person with the second occupant in full time employme Disability benefit is received by only 8% of the respondents' households; however other ener related benefits, such as *Winter Fuel Payment* are more common, received by more than 76% of t households.











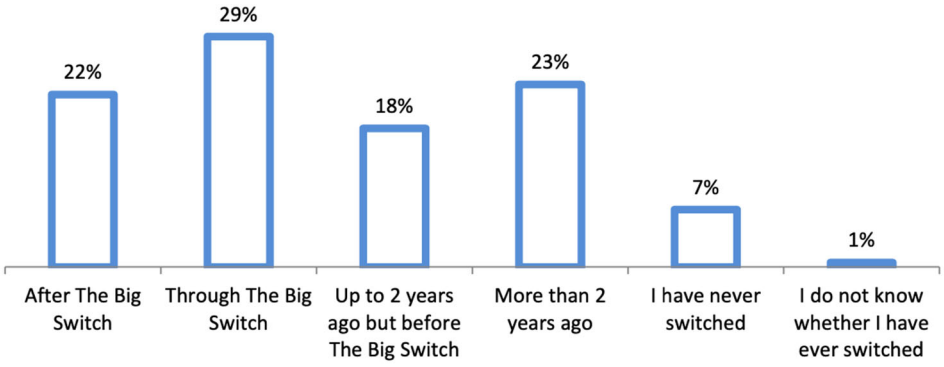
N.B. Some totals come to more than 100% because each respondent could give more than one answer

When did you most recently switch your energy supplier?

29% of those who answered the survey switched supplier through TBS. Although they did not switch as part of TBS itself, 22% of respondents stated that they switched their energy supplier after TBS.

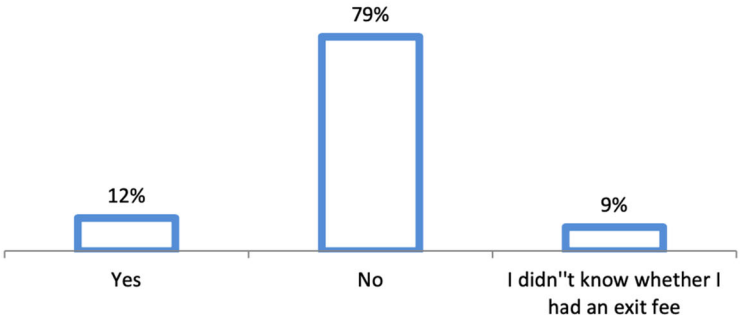
A further 18% of respondents had switched during the previous 2 years, while more than 23% had done so more than 2 years ago.

7% said they had never switched and a very small proportion did not know whether they had ever switched.



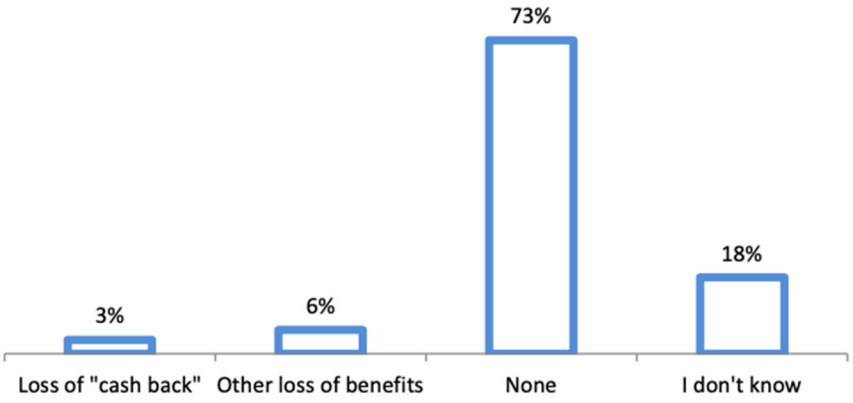
Did you have an exit fee at the time of The Big Switch?

Most respondents (79%) did not have an exit fee at the time of TBS. 12% of them stated that they had an exit fee, and 9% of them did not know whether they had one or not.



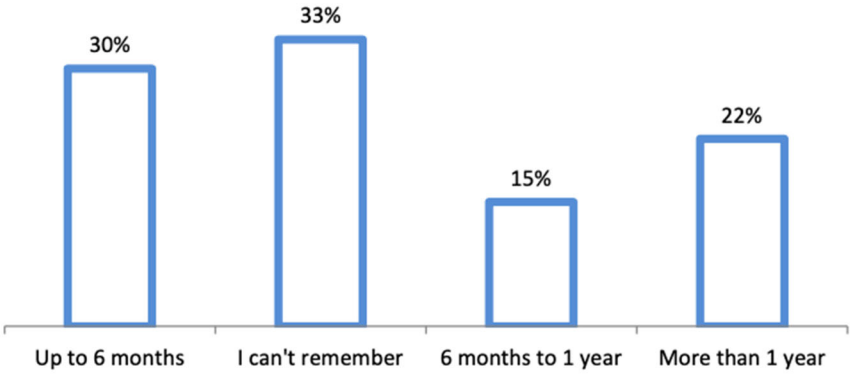
Other penalties or loss of benefits at the time of TBS

Most respondents reported not having any penalty or loss of benefit from switching at the time of TBS. 18% of them did not know whether they had any. The potential loss of "cash back" affected 3% of the respondents, and 6% specified other loss of benefits at the time of TBS.



How long would you have had to wait before being able to change without penalty?

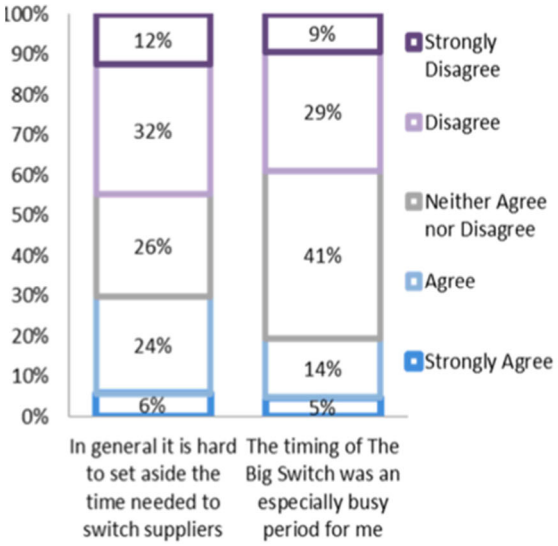
More than 60% of respondents with exit fee or other loss of benefit at the time of TBS would have had to wait less than 1 year before being able to change energy supplier without any penalty.

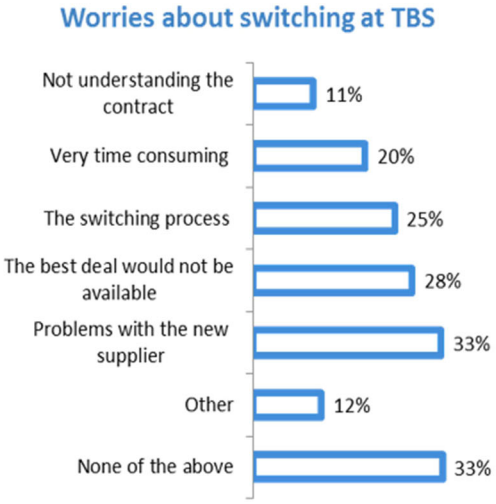


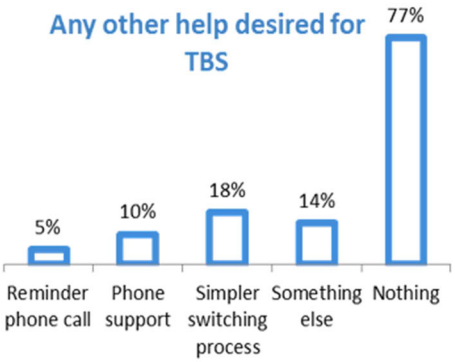
Attitudes towards TBS

Most of the respondents **took part in TBS with the aim** of saving money on their energy bill; however, other important reasons include curiosity about the campaign and the desire to encourage lower prices in this market.

One third of the respondents did not have any **reservations about switching through TBS**; however the same amount of people was concerned about having problems with the new supplier. 28% of respondents reported being worried about the best deal not being available for them at the end. Other relevant concerns were the time consuming switching process and the distress of not understanding the contract with the energy supplier.





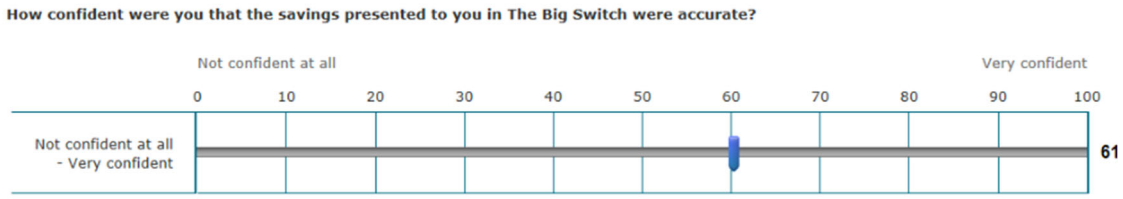


N.B. Some totals come to more than 100% because each respondent could give more than one answer

30% of respondents reported that for them it is hard to set aside the **time needed to switch suppliers**, while for 42% of them it is not that hard to find.

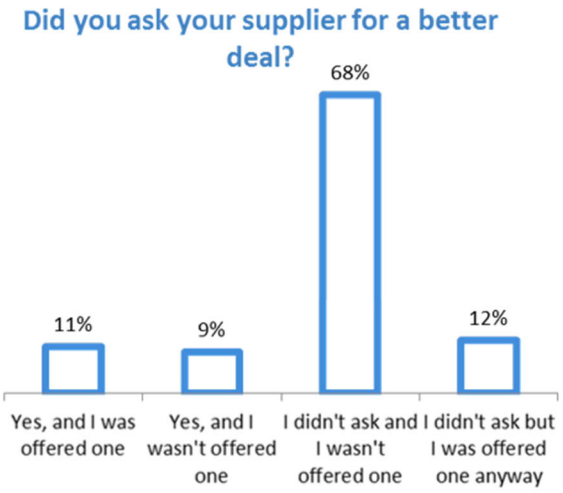
With respect to the **timing of TBS**, 19% of respondents said that it happened at an especially busy period for them.

On average, respondents awarded TBS 61 out of 100 in terms of **confidence about the accuracy of the saving figures** presented to them.



Existing supplier at the time of TBS

Most of the respondents were **happy with their existing supplier** at the time of TBS. 23% of them were offered a better deal by their supplier at the time, either because they asked (11%) or because they were offered it without asking (12%), and of these respondents, 35% decided to change their tariff or method of payment with their existing supplier.

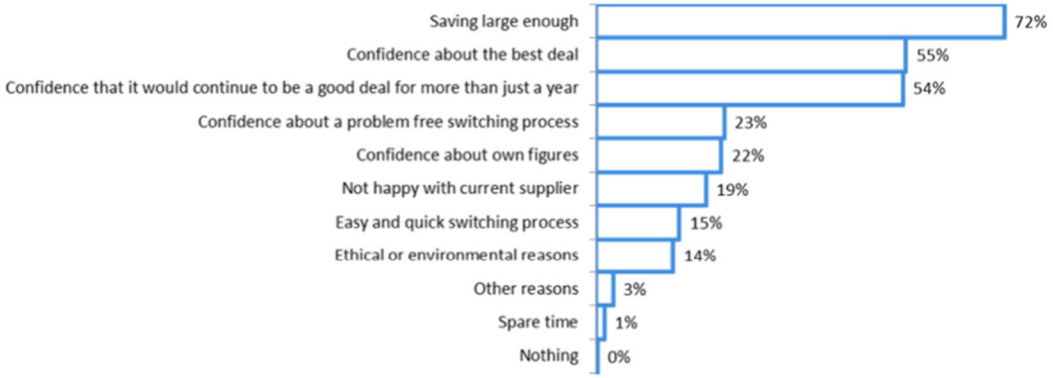


Reasons for switching

Most respondents declared that one reason that could persuade them to switch was if they were offered sufficiently **large savings**. Just over half of the respondents reported as relevant reasons the **confidence** that the **deal offered was the best one** they could get, as well as the confidence that it would continue to be a **good deal for more than one year**.

A similar proportion of respondents declared that being confident that the **switching process** would be **problem free** and being **confident about their consumption figures** and the amount of money saved would persuade them to switch energy supplier.

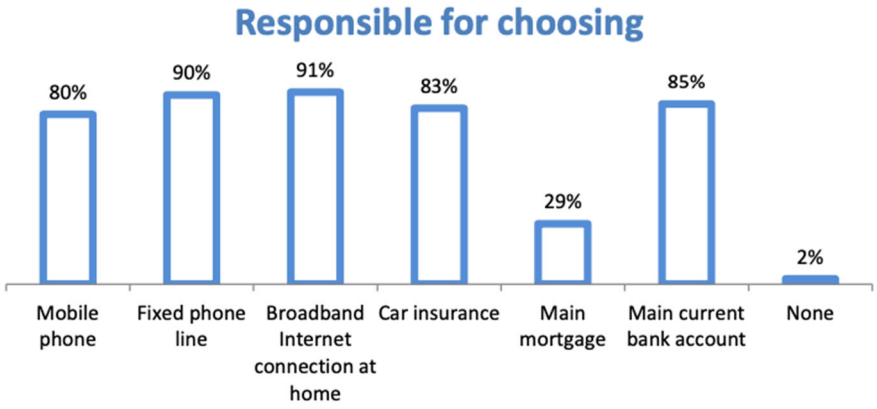
Very few respondents chose the option **nothing would persuade me to switch**.



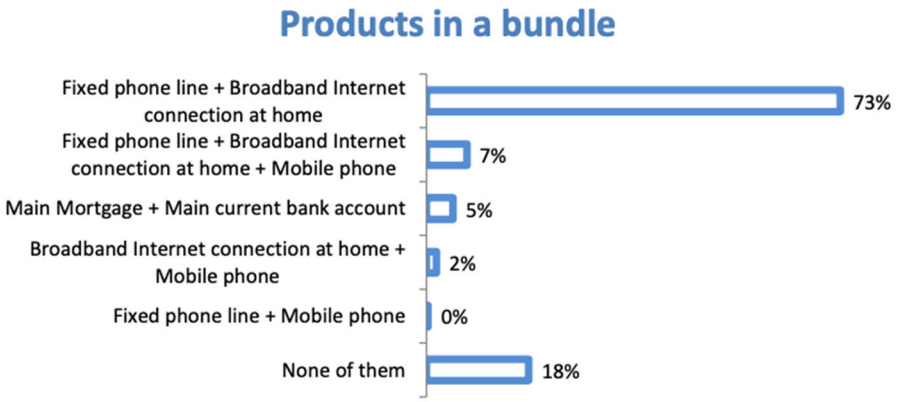
N.B. The total comes to more than 100% because each respondent could give more than one answer

Other markets

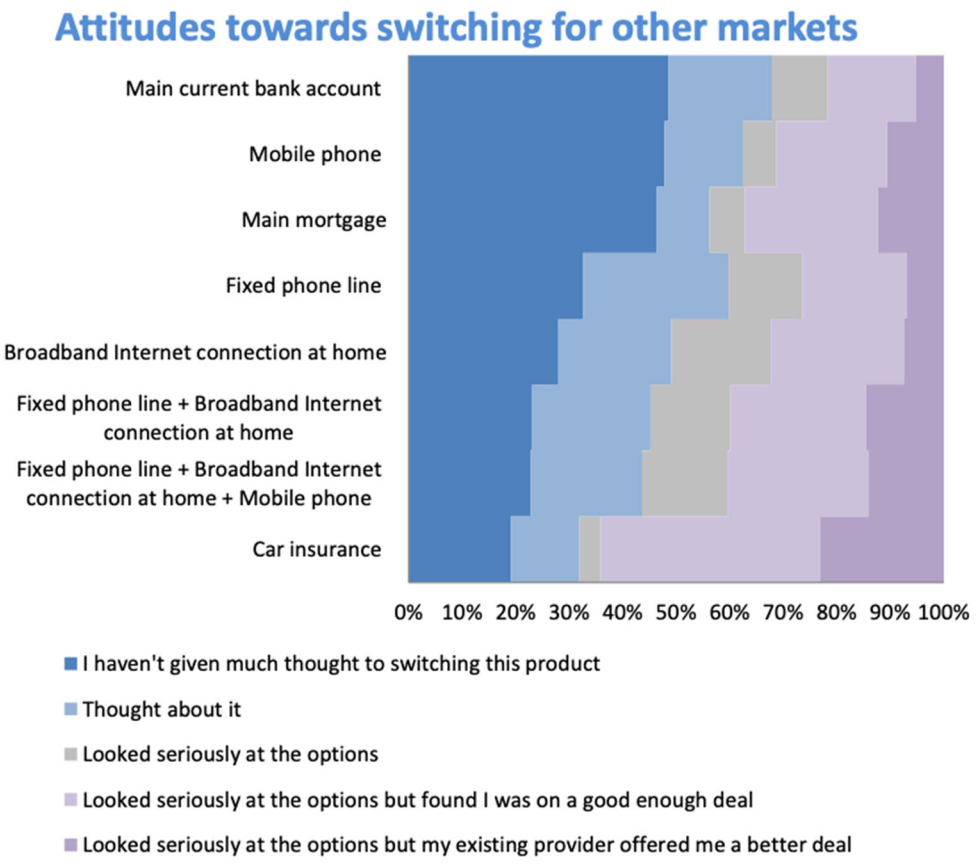
Most of the respondents are also responsible for choosing the suppliers in other markets such a **telecommunications, car insurance**, and **bank account services.**



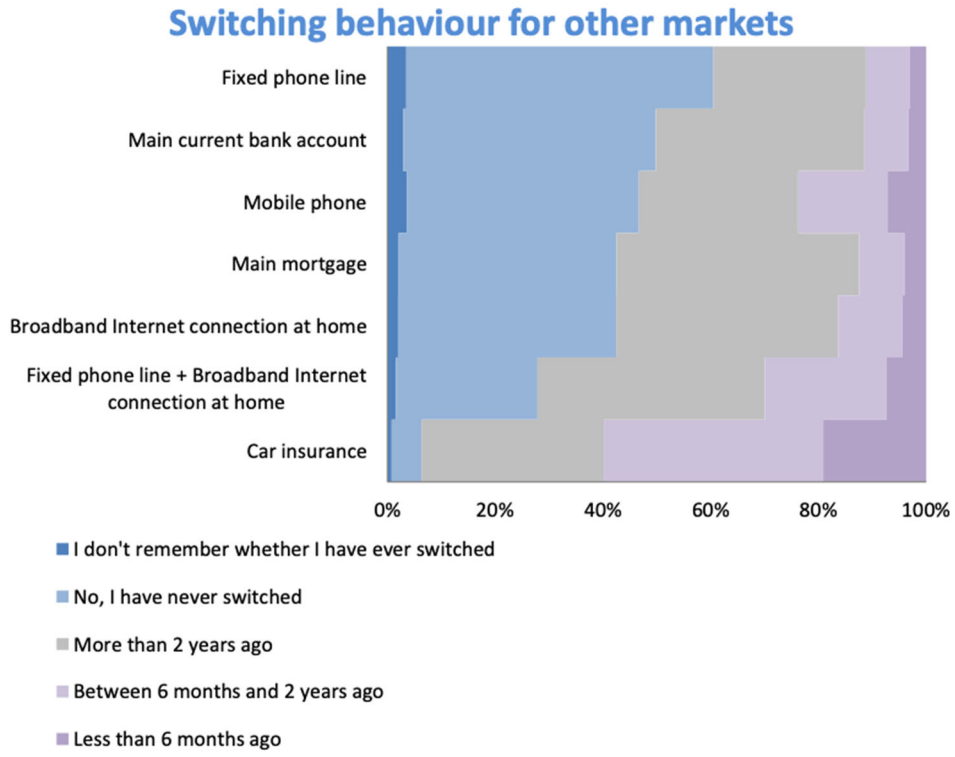
Some products are frequently bought in a bundle, particularly fixed **phone line and broadband Internet connection at home**.



For main current **bank account**, **mobile phone** and **main mortgage**, around 40% of respondents who switched supplier more than two years ago, **have not given much thought to switching**. Again consumers are more active in car insurance and bundled telecommunication products.

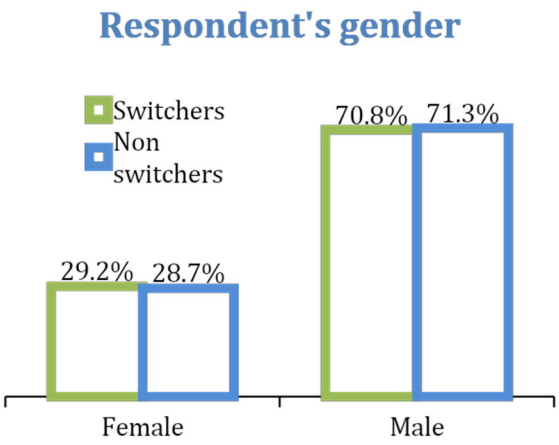


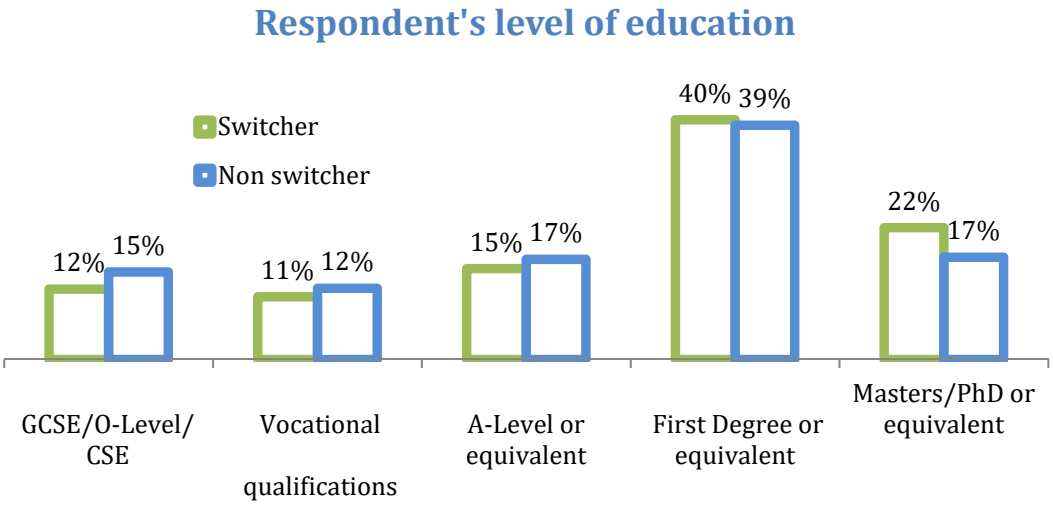
The markets for **fixed phone line** (not bundled) and **main current bank account** are those with the highest proportion of **static consumers** (who have never switched or do not remember whether they have ever switched). On the other hand, **car insurance** and fixed phone line and broadband Internet connection at home in a bundle are products with a higher proportion of **recent switchers** (switched less than two years ago). In the case of car insurance, more than a half have switched supplier in the last two years.



APPENDIX 1.6. Commercial database + follow up online survey

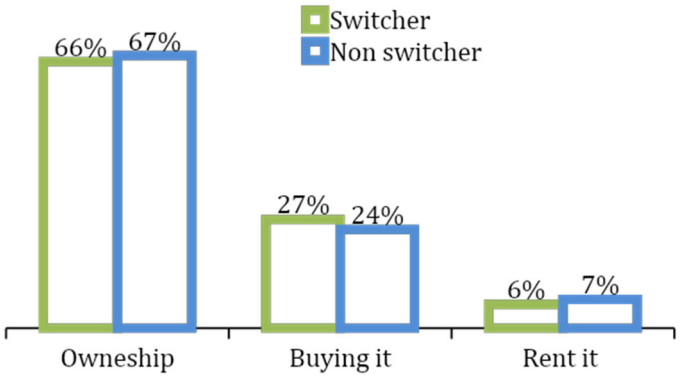
Socio demographic characteristics of respondents



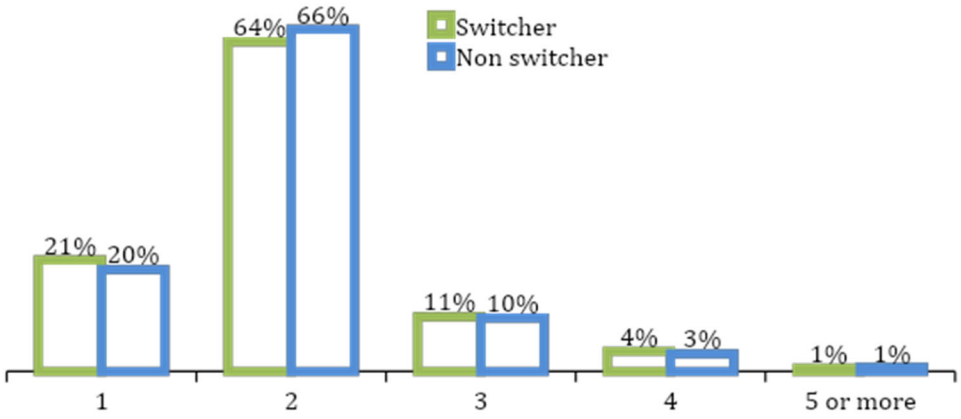


Household characteristics

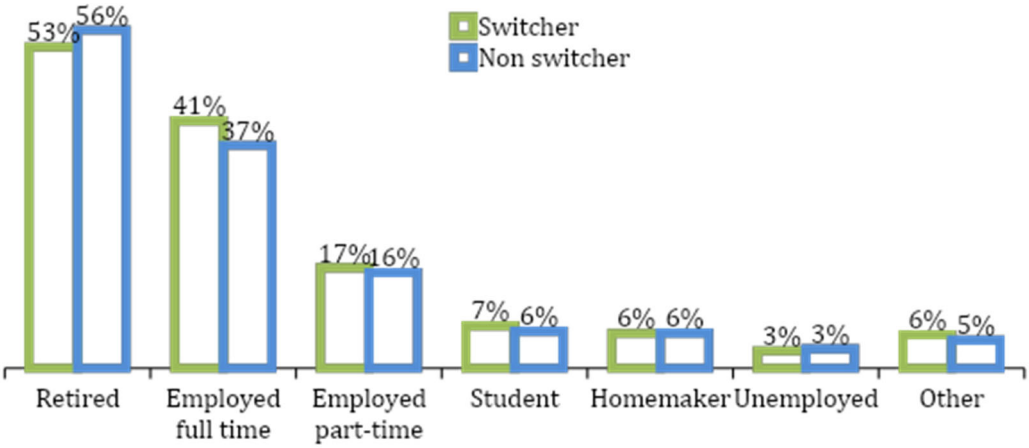
Tenure of house



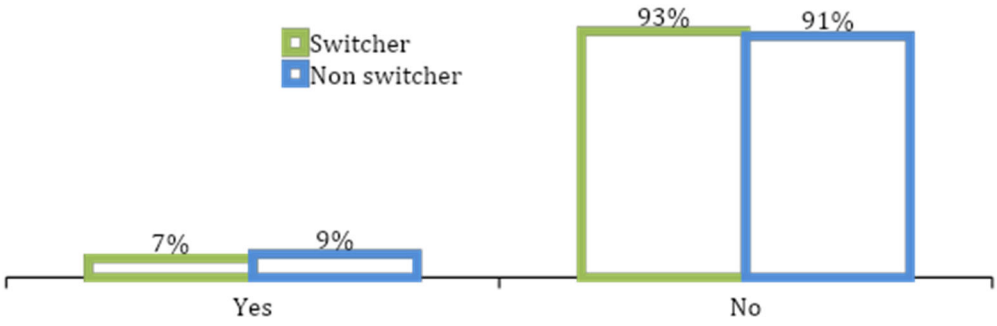
Number of adults in the household



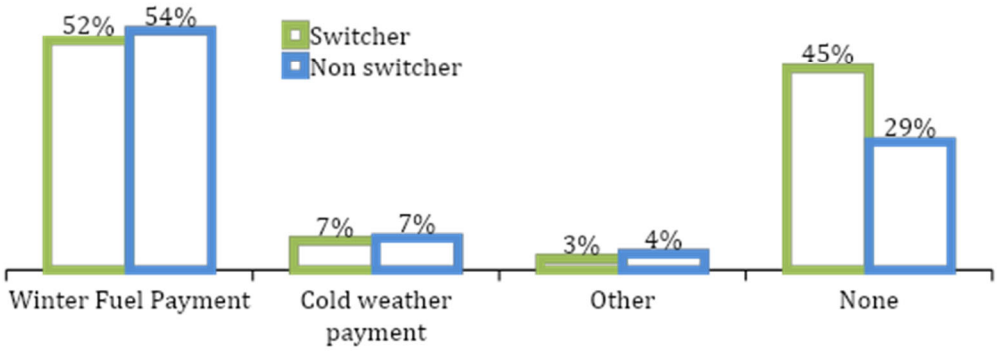
Household occupation



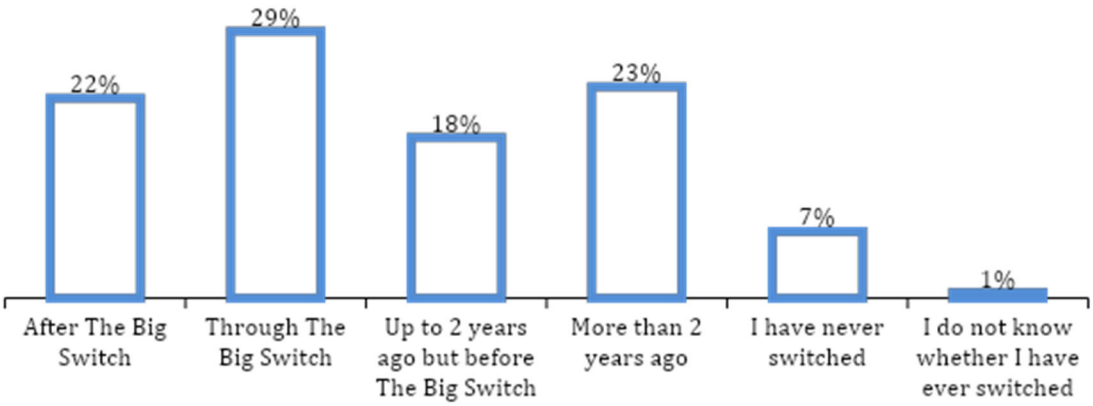
Household and disability benefit

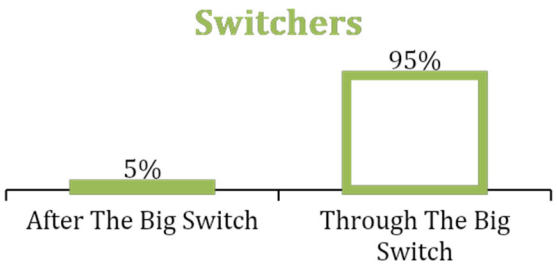


Household and energy related benefits

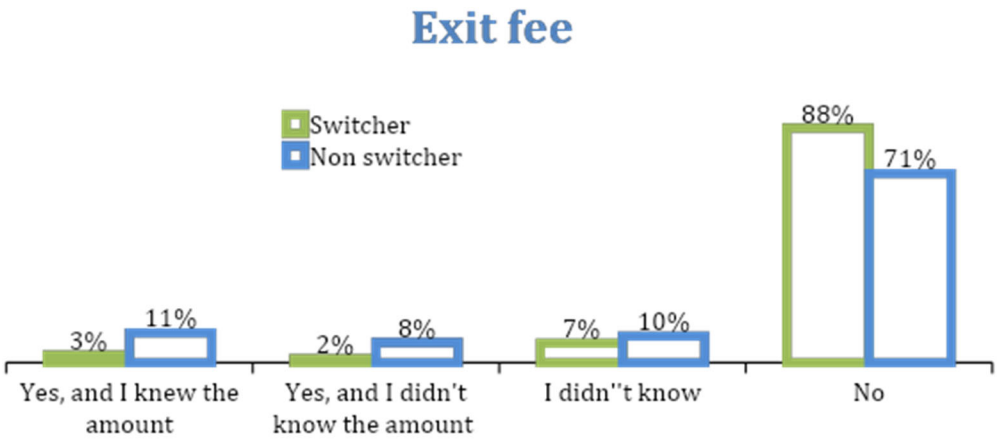


When did you most recently switch your energy supplier?

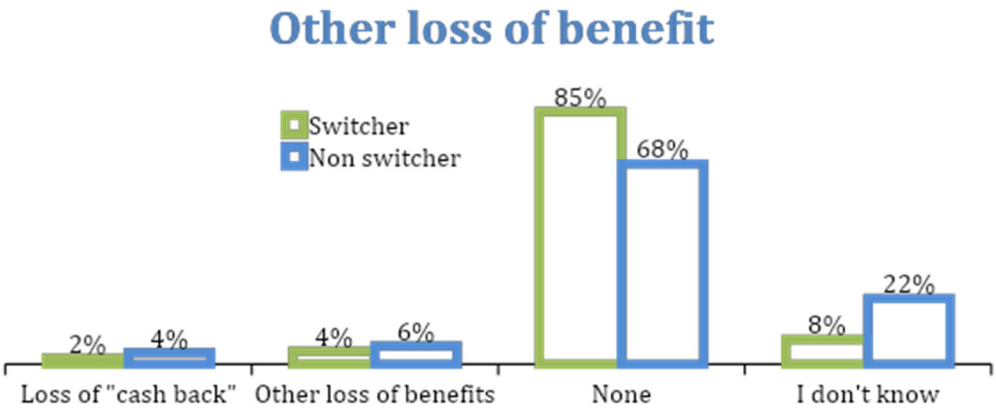




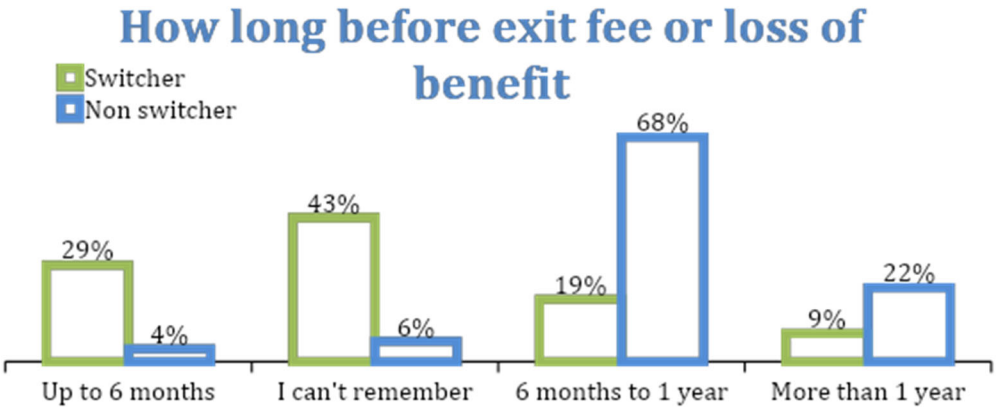
Did you have an exit fee at the time of The Big Switch?



Other penalties or loss of benefits at the time of TBS

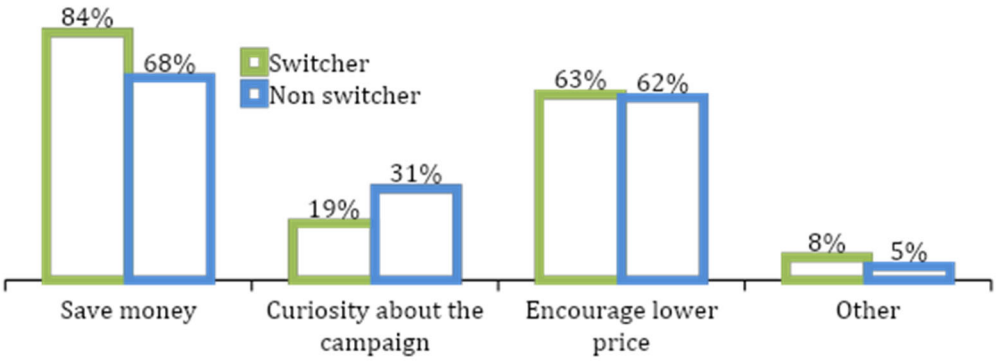


How long would you have had to wait before being able to change without penalty?



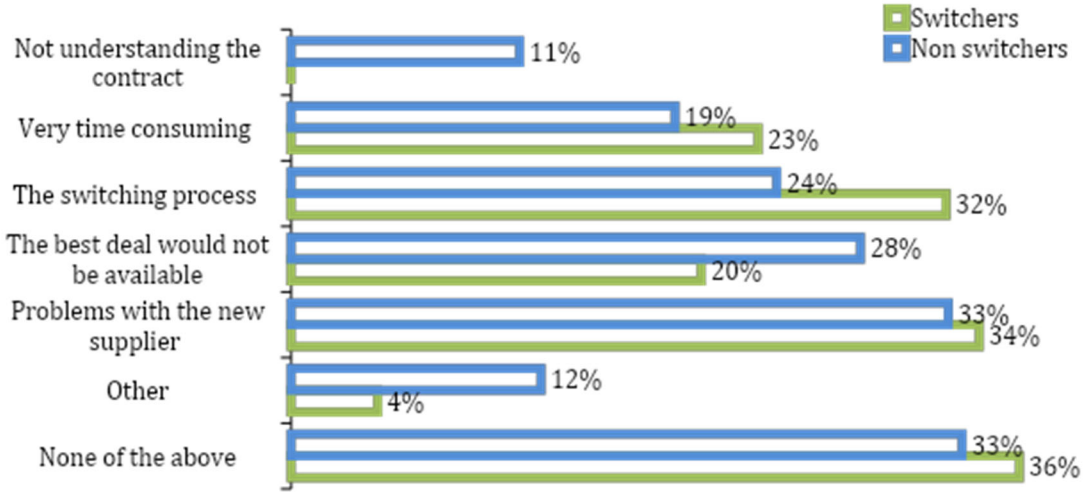
Attitudes towards TBS

Reasons for taking part in TBS



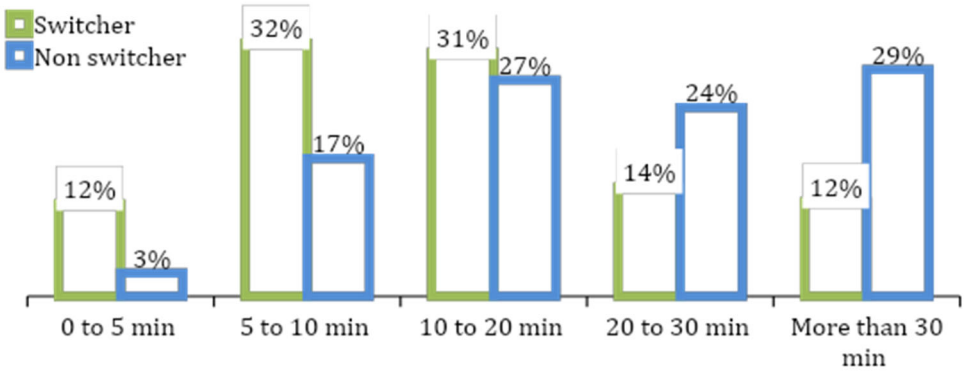
[32]

Worries about switching at TBS

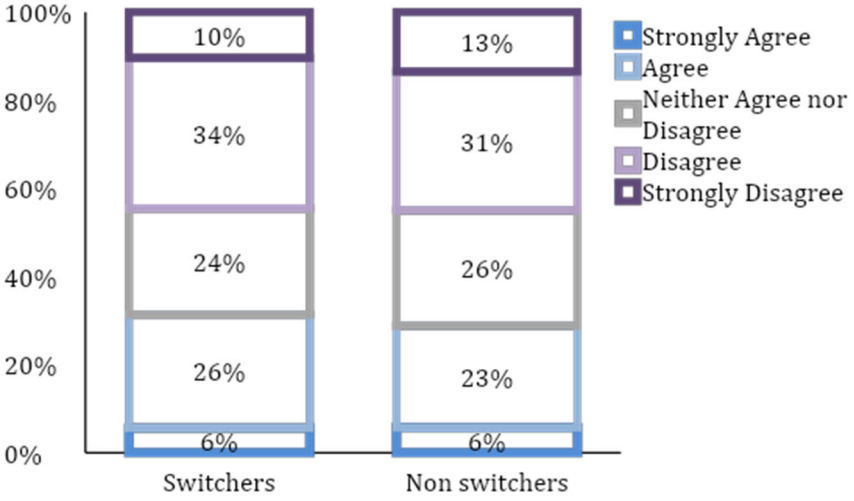


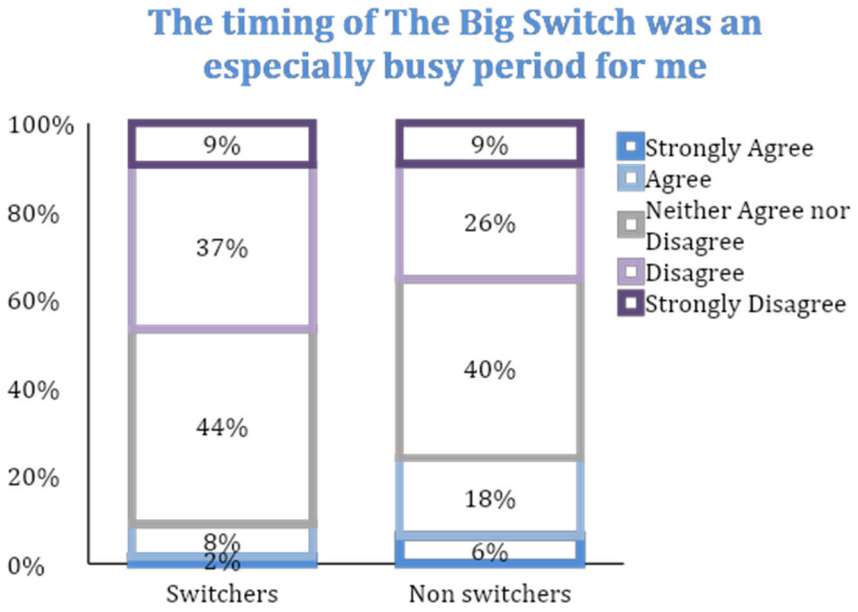
[32] There is one reason missing for non-Switchers: *not understanding the contract*

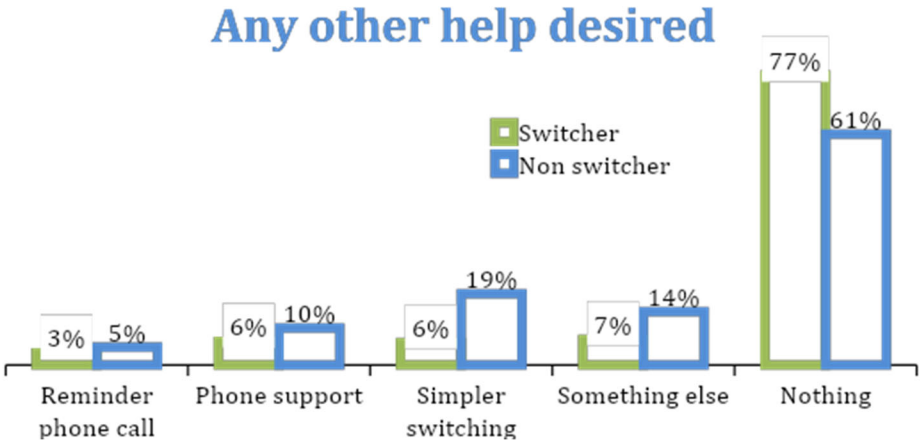
Own time to complete the process

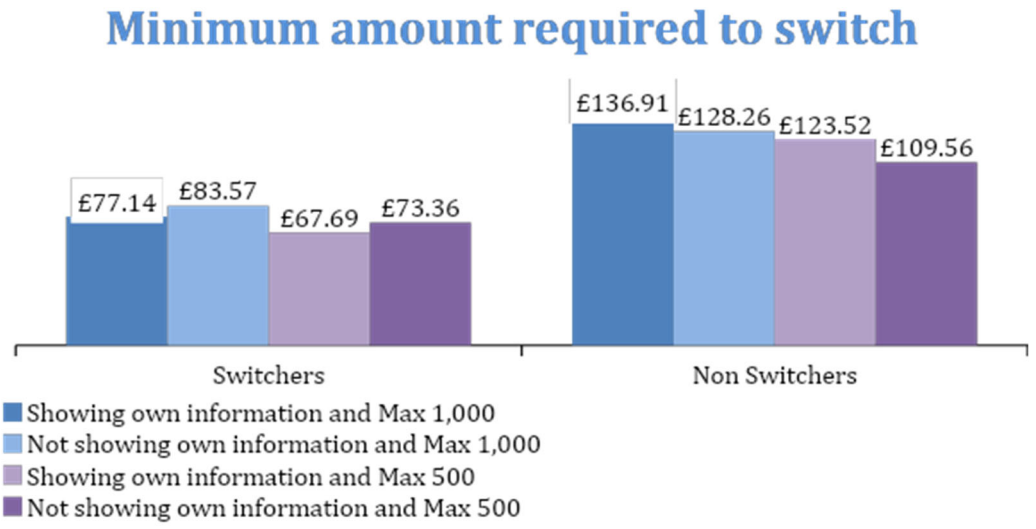


In general it is hard to set aside the time needed to switch suppliers

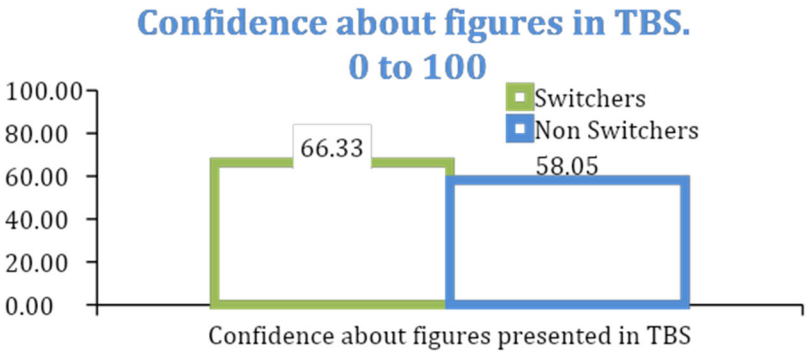




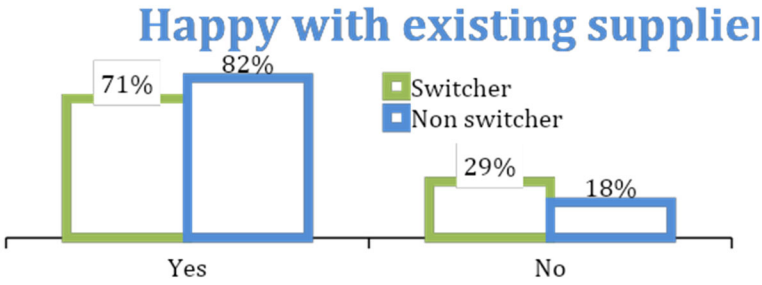




33

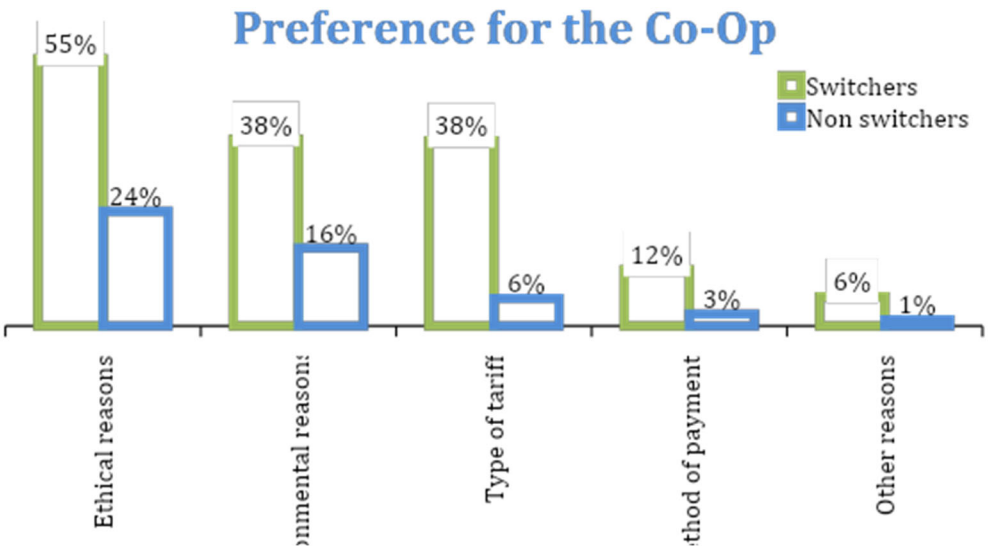


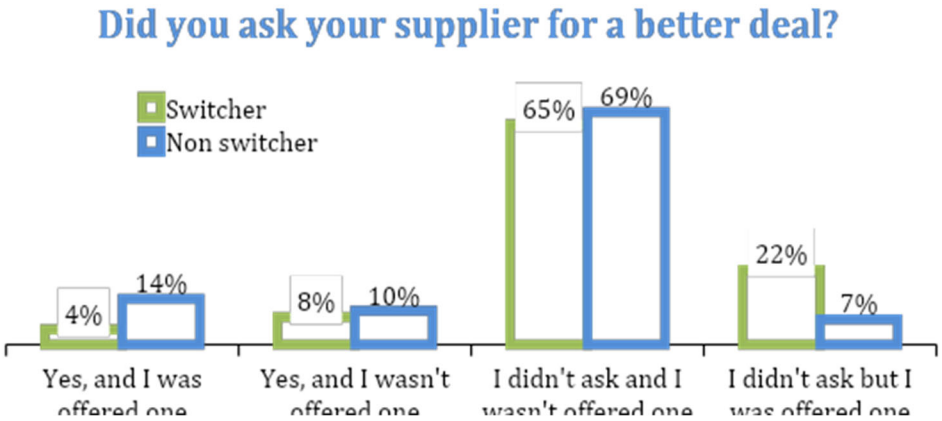
Existing supplier at the time of TBS



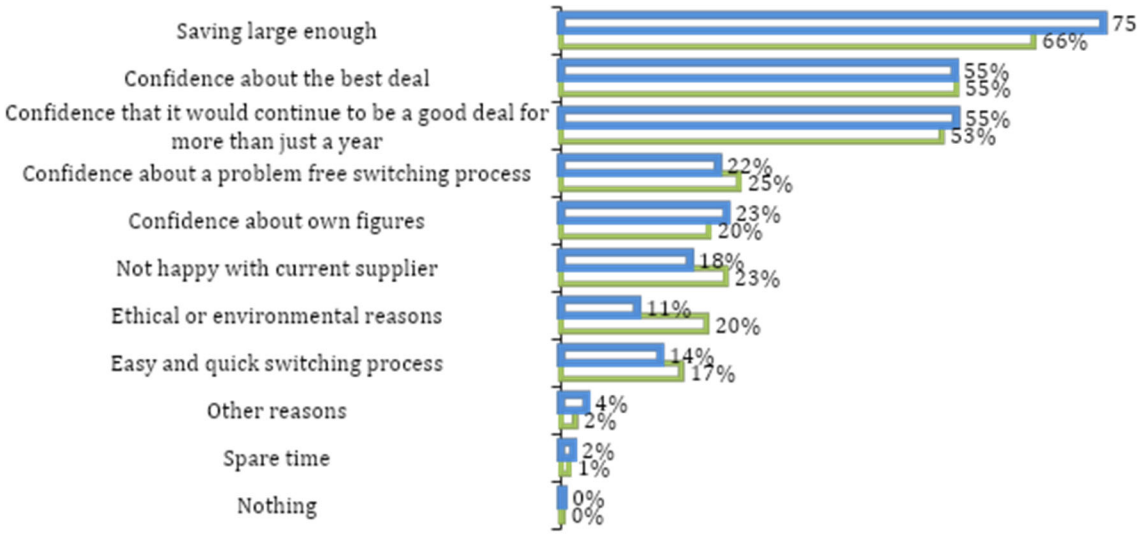
There is a stronger preference for the Co-Op by Switchers, especially related to ethical reasons.

[33] The design of the questionnaire presented four different ways of collecting this information. The reason was to investigate whether this different design influenced the answers. We distributed the sample randomly among the four different groups.

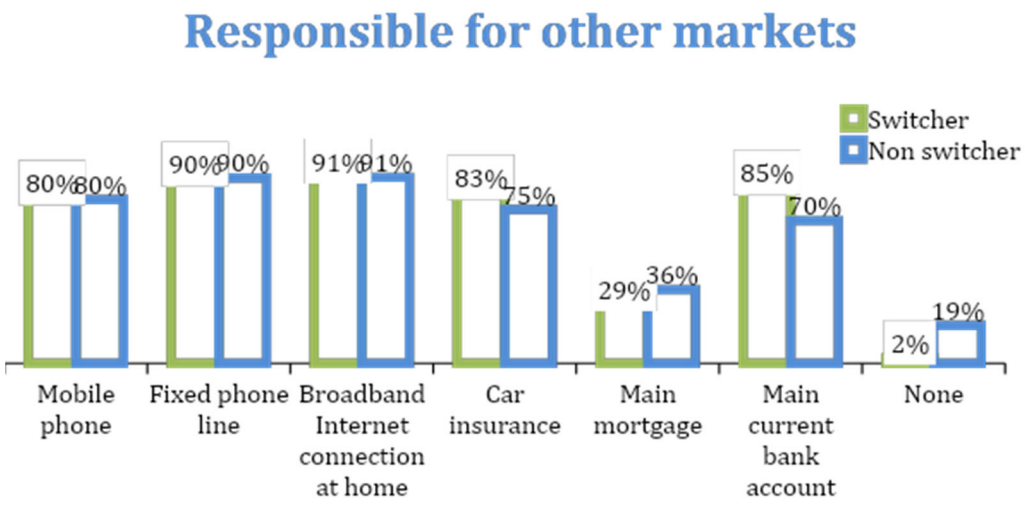




Reasons persuading for switching



Other markets



Financial factors

Statistic	Non-switchers	Switchers
Median size of bill (£)	1,148	1,158
Median size of saving (£)	96.72	129.60
Median saving as percentage of existing bill	9.2	11.7
% Existing energy deal includes an exit fee	26.1	4.9

APPENDIX 1.7. Dataset description

This data collection combines individual level data from a collective switching exercise, known as 'The Big Switch', in the UK residential energy market and two subsequent waves of Internet based surveys. 'The Big Switch' was run by Which?, the UK's Consumer Association, and 38 Degrees, a campaigning organisation. Its aim was to collect together energy consumption information from a large number of consumers in the hope that this aggregated block of consumers would enable a better deal to be obtained from energy companies. The Centre for Competition Policy (CCP) obtained the underlying individual data that resulted from this collective switching exercise along with the opportunity to contact participants to obtain further information. Due to copyright restrictions only data from the second survey wave is available for download.

The data from the collective switching exercise relates to around 111,000 participants (after data cleaning) who had to decide whether or not to switch energy suppliers in Spring 2012. Uniquely we observed the offers made to those who did not switch as well as to those who did switch. However, as individuals had to opt-in to take part in the collective switching exercise the data is not representative of the population as a whole.

In addition to this commercial data from Which?, two survey waves were conducted where participants in the collective switching exercise were emailed a questionnaire to complete. The survey was conducted online and it should be noted that the majority of participants who signed up to 'The Big Switch' exercise did so using the Internet.

Around 15,000 people (after data cleaning) provided full responses to the questionnaire in the first survey wave in Spring 2013. The purpose of this first survey wave was to collect extensive information on household characteristics, engagement with the energy market and context surrounding individuals' switching decision in 'The Big Switch'. The aim was to combine data from this survey wave with information from 'The Big Switch' itself to allow the investigation of the determinants of supplier switching in the UK energy market.

Around 11,000 people (after data cleaning) provided full responses to the questionnaire in the second survey wave in Spring 2014. The purpose of this second survey wave was to investigate the minimum required saving necessary for an individual to be willing to switch energy supplier along with the factors determining this minimum required saving.

For further information about the whole project which resulted in this data please read:

Deller, D., M. Giulietti, J.Y. Jeon, G. Loomes, A. Moniche and C. Waddams (2014), "Who Switched at 'The Big Switch' and Why?", available to download at:

http://competitionpolicy.ac.uk/documents/8158338/8194340/Big+Switch+-+Results.pdf/2e01588d-6564-4e28-b06d-233eaad389c4

Uploaded Dataset:

As mentioned above only the data from the second survey wave is available to download. It is important to understand the sampling structure of those taking part in this second survey. Initially the approximately 140,000 participants with usable contact details were split into two equally sized and randomly selected groups of around 70,000 each. The first block of 70,000 individuals were sent the first wave survey. The second wave survey was sent to the following individuals:

1. (i) Respondents of the first wave survey who had agreed to be re-contacted for further research.
2. (ii) Individuals from the second block of 70,000 who expressed a willingness to be contacted by CCP to Which?

The survey questionnaire which respondents saw is provided in the file: 'TBS_Wave_2_questionnaire_Feb_14'

This document not only contains the questions respondents were asked but also provides the numerical codes for particular responses contained in the actual dataset.

The raw dataset is contained in the file: 'TBS_Wave_2_survey_data_Feb_14.csv'

In this file missing values are marked as -99. In total there are 13,654 observations (including incomplete records) in this datafile. The entries have been anonymised.

APPENDIX 2. Econometric analysis at the postcode level

At the postcode level, our database contains information for 1,127,683 postcodes. Of them, there are 124,803 postcodes with at least one registered household for *The Big Switch* while there are 1,002,880 postcodes with no single household expressing any interest in the campaign. The average number of registered households by postcode is 0.134, with std. dev. 0.419. Because the standard deviation is much larger than its mean, we have an indicator of over-dispersion. To visualize the excess of zeros, Table 1A displays the distribution of postcodes in England and Wales by the number of registered households for *The Big Switch*.

Table 1A. Distribution of postcodes by number of households joining *The Big Switch*

Number of households joining *The Big Switch*	Number of postcodes	Number of households joining *The Big Switch*	Number of Postcodes
0	1,002,880	6	46
1	103,103	7	8
2	17,671	8	5
3	3,239	10	2
4	603	12	1
5	124	14	1

The information in Table 1A must be read as follows. There were in England and Wales 103,103 postcodes with exactly one household expressing their interest in *The Big Switch*.

Regarding the explanatory variables, we have information about the number of occupied households and also whether the postcode is rural or urban. According to the Census 2011, the average number of occupied households in England and Wales is 20.22, with std dev. 14.54 and 1 out of 4 postcodes is rural in England and Wales. We use CACI for estimations of the household average income for year 2012. The average household income in thousands in England and Wales at the postcode level is 36.99, with std. dev. 11.93. For internet connection, we have that the average internet penetration in England and Wales at the postcode level is 82.38%, with std. dev. 62.34.

Table 2A gives a snapshot of the data we have by breaking the sample in two categories: postcodes with no single households registering for *The Big Switch* and those postcodes with at least one registered household at *The Big Switch*.

Table 2A. Explanatory variables at postcode level. Summary statistics

	Postcodes without registered households		Postcodes with registered households	
Variable	Mean	Std. Dev.	Mean	Std. Dev.
Number of occupied households	19.428	14.143	26.659	16.038
Rural (dummy)	0.244	0.430	0.252	0.434
Household average income (in thousands)	26.442	11.852	41.471	11.607
Lowest income quartile (dummy)	0.268	0.443	0.120	0.325
Internet penetration (in %)	82.449	65.038	81.890	33.627
Total number of postcodes	1,002,880		124,803	

Table 3A. Econometric estimations and marginal effects at the postcode level

Variable	(1) True counting model	(2) Zero-excess model	(3) Marginal effects
Dissemination			
Internet penetration	0.0005***	-0.0164***	0.0008***
	(0.00006)	(0.0004)	(0.00002)
Information campaign (dummy)	-0.0266	0.2033***	-0.1284***
	(0.0303)	(0.0415)	(0.0018)
Vulnerability (Ofgem)			
Rural (dummy)	0.1813***	-0.4033***	0.0405***
	(0.0098)	(0.0238)	(0.0009)
Household average income (in thousands)	0.0117***	-0.0474***	0.0035***
	(0.0004)	(0.0014)	(0.00006)
Lowest income quartile (dummy)	-0.2278***	-0.1630***	-0.0176***
	(0.0252)	(0.0337)	(0.0016)

N = 1,127,443; Log pseudolikelihood = -430,012.3; Wald chi2 (5) = 1,353.47; Prob > chi2 = 0.0000
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 3A presents the results of the econometric estimations, which included an exposure variable, the number of households per post code, to control for the number of times the event could have happened and robust standard errors. Model (1) is the true counting model and model (2) is the zero-excess model. The last column (3) displays the marginal effects of the independent variables after the ZINB estimation, where the predicted number of households joining TBS at the postcode level is 0.1127. All independent variables in models (1) and (2) and their marginal effects (3) are highly significant at the 1% level, with the exception of the information campaign variable that is not significant in model (1)